

December
1956

Vol. XXI, No. 12

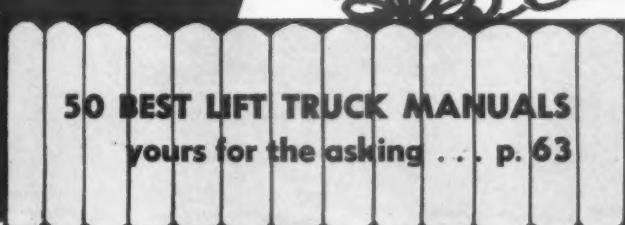
Western Industry

American Indians on your
production line? (special
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How industrial
engineering
consultants can
help you . . . p. 42

How to get
more space
without
expanding
your plant
... p. 49

50 BEST LIFT TRUCK MANUALS
yours for the asking . . . p. 63



when you want
prompt delivery and
courteous service...



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No man is an island...not when Republic is within bottle-floating range.

Getting what you want...*when you need it*...is a *snap* when Republic is on hand to take up the slack. Republic's handy warehouses, offices, and stores...backed by the scooter order-handling system...exist for just one reason: to fill *your* orders fast.

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An independently owned and operated company serving Western Industry

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HURRY UP Process For Fertilizer...

The fertilizer business is primarily one of materials-handling. And, surprisingly enough, it's also a business of speed. Bring in the raw materials, mix and process, then store. When an order comes in—ship within 48 hours. That's the policy at Bandini Fertilizer Co., Los Angeles.

Key to this fast operation is a fleet of Clark fork trucks.

Because fertilizer is a bulky commodity and storage is a problem, customers order

almost daily. Delayed shipments can be costly. Says Jack Baker, General Manager of Bandini, "The fact that we ship 50% of our orders the same day, and, the lack of confusion on our shipping docks, certainly proves the effectiveness of the Clark fork lifts and total palletization."

A quote from you could be just as enthusiastic. Your local Clark dealer can show you why. He's listed in the Yellow Pages under "Trucks, Industrial."

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EQUIPMENT**

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Industrial Truck Division, Battle Creek 28, Michigan**

A BETTER BUY WITH LOCAL SUPPLY *Genuine Clark Parts!*
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December 1956

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ARTICLES

American Indians on your production line? 39

Results of a special WI survey of Western plants where they have been employed reveal a well-worth-investigating source of man-power.

How to buy the industrial engineering you need 42

Important data on what an IE consultant can do for your plant, how to work with him and costs involved, as told by a Western expert.

Popcorn, a new packaging medium 45

Here's how Ampex Corp. boosted packaging effectiveness 99% by using ordinary popcorn to protect tiny electric motors during shipment.

Office building turned plant 46

Weak roof, weak floor, wrong partitions . . . here's how AiResearch put plant engineering to work to overcome these conditions economically.

Space is where you find it 49

. . . the trick is knowing where to start looking. Four case histories tell how one Western plant increased utilization of existing space.

Selected production and maintenance ideas 55

. . . for Western plant operators (Know-how Notebook—Part 1)

50 best lift truck manuals—yours for the asking 63

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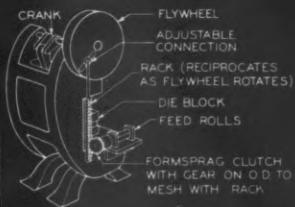
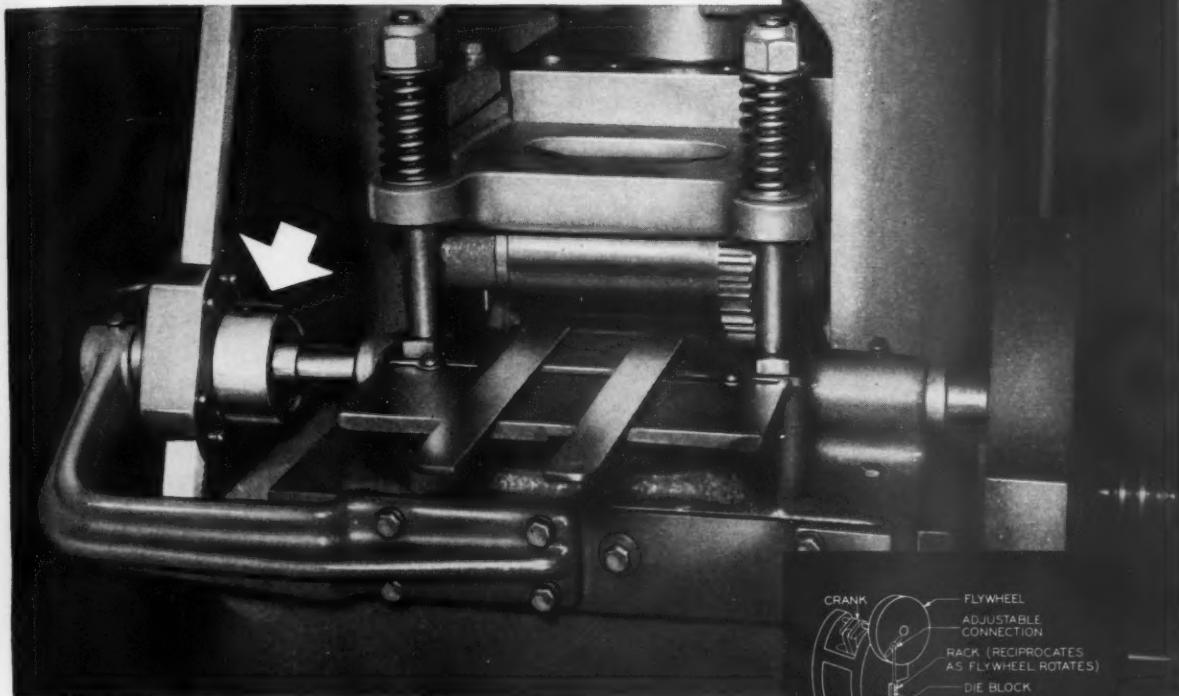
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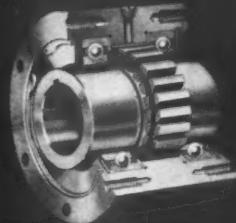
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The Essential Publication for Manufacturing Management in the New Industrial West

DON'T JUST REPLACE—MODERNIZE!



Shown is a rear quarter view of a typical punch press. Feeding occurs as press descends and ascends. Stock is fed in halfway up the stroke and halfway down the stroke.



NEW-BALL BEARING SEALED CLUTCHES

Formsprag double ball bearing clutches incorporate mechanical seals to insure retention of oil during indexing. They are available in standard bore sizes from your distributor.



THE COMPLETE STORY ON MODERN FORMSPRAG CLUTCHES

This new 26-page catalog shows how easy it is to replace old-style feeding mechanisms with modern Formsprag Clutches. All standard models are listed. Write direct, if you wish.

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OVER-RUNNING CLUTCHES

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"Bolt" problems . . . two kinds

A LIGHTNING BOLT flashes from angry skies. What happens to electrical service? Nothing. This is one kind of "bolt" problem the electrical industry has learned to cope with.

But how about the mechanical kind of bolt used to connect electrical lines and equipment? They have to be strong and flawless, these fasteners . . . and completely reliable . . . to maintain service under all conditions.

There's a good answer now to that too: *Silicon bronze* fasteners . . . strongest of all highly conductive fasteners. RB&W was first to work this material successfully into standard fasteners.

RB&W—A MAJOR SUPPLIER TO INDUSTRY

A leader in its field for over 111 years, RB&W turns out the finest quality standard fasteners for the electrical as for virtually all major manufacturing industries. *Modern facilities, new techniques, long experience . . . all combine to make RB&W fasteners truly the "strong point of any assembly."*

CALL IN THE RB&W "FASTENER MAN"

Impressive savings can be realized on fastener costs by proper application. It might pay you well to have the RB&W "Fastener Man" take a good look at your requirements.



111th year

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FROM THE WEST"

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RB&W FASTENERS - *Strong Point of any assembly*

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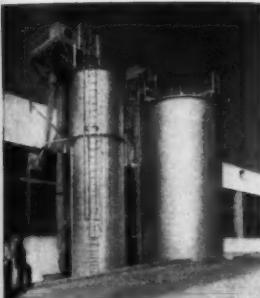
WESTERN INDUSTRY — December 1956



West Coast

3 WEST COAST PLANTS
7 FACTORY BRANCH STORES

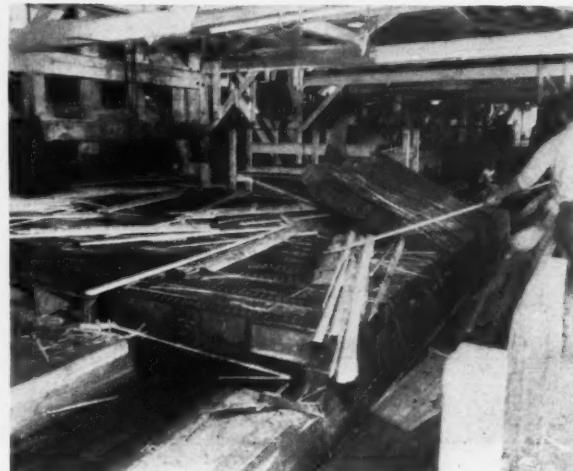
INDUSTRIAL DIGEST



Keeps Sugar Sanitary With Bulk-Flo System

Link-Belt Bulk-Flos and screw conveyors guard sugar against dust and moisture at Tuxedo Candy Company, San Jose, Calif. The vapor-sealed, self-discharging combination feeder-conveyor-elevator units carry sugar from trucks directly to storage bins. If desired, sugar can be discharged from Bulk-Flos into the plant. Full data on the versatile Link-Belt Bulk-Flo combination feeder-conveyor-elevator is contained in Book 2475.

Link-Belt Conveyors Mechanize Pulp Mill's Complete Utilization of Logs



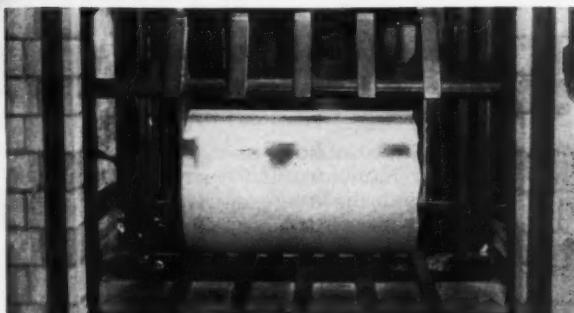
WASTE WOOD on chain transfer conveyors is discharged to two parallel flat belt conveyors, which deliver to chippers in wood room.



HOG FUEL feeder below hopper pile serves reclaim conveyor to new power plant.



CHIPS are discharged by 30-in. wide belt conveyors to another at the lower level.



Link-Belt Newsprint Lowerer Improves Handling and Storage, Reduces Damage

Best use of limited space and faster, safer unloading of newsprint are benefits derived by the Times-Mirror Company, Los Angeles, Calif., from two Link-Belt paper roll lowerers. Units unload 21 one-ton rolls every 13 minutes. Annually, this represents a five-ft. wide, 2,074,348 mile long sheet.

Rolls deposited on finger supports of lowerer are lifted by an ascending tray as chains travel over the head sprocket, then lowered to desired level

on descending run. Fingers at unloading position intercept roll and deliver it onto the lower floor.

LINK-BELT COMPANY

Plants, Sales Offices and Factory Branch Stores at San Francisco 24, Los Angeles 33, Seattle 4. Sales Offices and Factory Branch Stores at Portland 10, Spokane 10, Oakland 7, Salt Lake City 1. Stock Carrying Distributors in Principal Areas.

14-048

Waste elimination — that's the enviable record of Potlatch Forests, Inc., at its multiple-mill site at Lewiston, Idaho. Coordination of its lumber, veneer and pulp and paper mills permits complete utilization of logs. The efficient use of materials is enhanced by Link-Belt conveyors, elevators, feeders and screens.

Many Products

Engineered production starts at log harvest. Logs are selected for processing into products for which they are best suited. Sawmill edgings, trim, slab and odd pieces — formerly scrap — are made into chips for the pulp mill, as are peeler log cores. Bark and hog fuel are burned at the powerhouse, while sawdust is compressed into fire-place logs and stoker fuel.

Link-Belt Aids "Flow"

Bull chains pull logs from pond to Link-Belt log decks. Multi-strand steel chain conveyors move logs to and from hydraulic barkers. Chain-

type transfer conveyors move sized logs to one of two 30-in. flat belt conveyors routed to chippers. Screened chips pass directly to a troughed belt for transfer to another 30-in. belt conveyor at the veneer plant, then to a steeply inclined belt to the chip storage tanks. Here a 17-ft. dia. Link-Belt rotary plate feeder discharges chips to another inclined conveyor linked with a tripper for discharge to digesters. Sawmill wood room to veneer plant conveyor is also used to move cants. Link-Belt screw and belt conveyors and elevators handle pebble lime and salt cake. Call your nearest Link-Belt office for help in solving your material handling problems . . . you'll profit by it.

... for more details, circle No. 5 on Reader Service Postcard

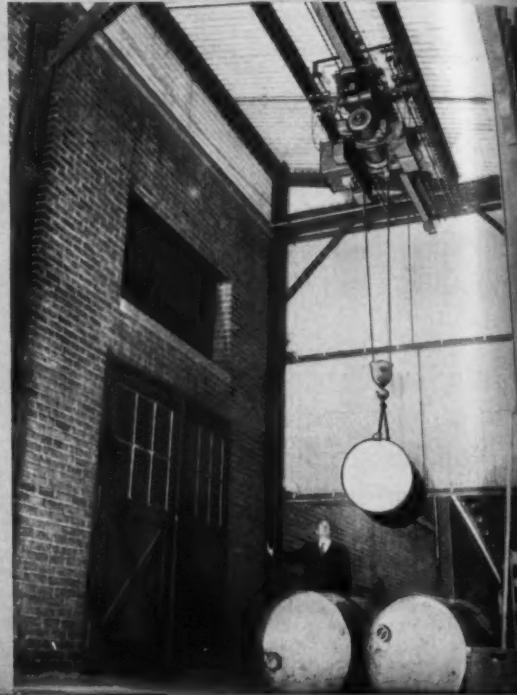
Cuts Die-Handling Time in $\frac{1}{2}$

A large aircraft builder wrote: "Time and handling in this operation have been cut approximately in half by use of the Tramrail. In addition, operators report much greater safety and less danger of personal injury in handling heavy parts."



Automatic System Eliminates Three 10-ton Trucks

The need of three 10-ton trucks to haul materials between buildings was eliminated by a Cleveland Tramrail automatic dispatch system which does the job quickly without attendants accompanying. In addition, many man-hours of working time are saved daily and the load on an elevator is greatly reduced.



OVER 40,000 CLEVELAND TRAMRAILS NOW SERVE INDUSTRY

NOTE THIS: Regardless of size or type,
MOST CLEVELAND TRAMRAIL INSTALLATIONS PAY FOR THEMSELVES WITHIN ONE YEAR—and they keep on paying handsome dividends year after year thereafter.

If you do not have an accurate cost record of all your manufacturing operations, you may be surprised at the tremendous price you are paying for picking up, moving and setting down. This may be your biggest expense item.

Illustrated here are a few actual case examples of the great savings and other important advantages

GET THIS BOOK!
BOOKLET No. 2008. Packed with valuable information. Profusely illustrated. Write for free copy



CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
8864 EAST 284th STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

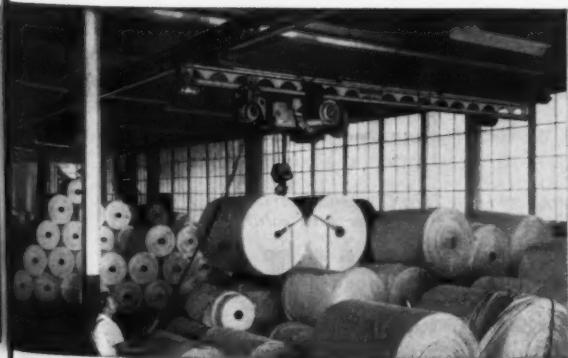
Saves \$5,000 Yearly on Steel Cost

A West Coast manufacturer installed a completely motorized 5-ton Cleveland Tramrail transfer bridge that interlocks with an outside track over a railroad siding. Because this enables handling 5-ton bundles, a \$2.00 per ton bundling charge is saved on steel purchased. Handling time is also saved. Since 200 tons are used monthly the total savings amount to \$5,000 per year.



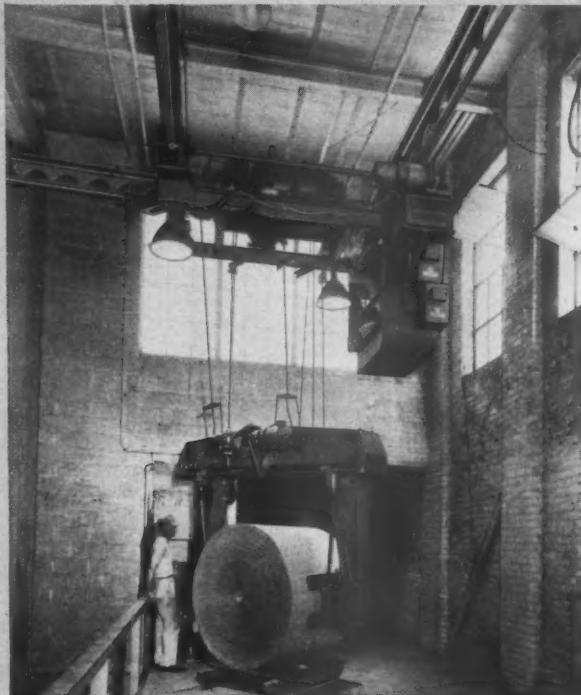
INSTALLATIONS IN AMERICA

Cleveland Tramrail has brought about in nearly every industry. Most likely you, too, have materials handling jobs in your plant from which big savings can be made. Why not have our engineers make a study and present recommendations, without obligation, of course?



7,500 lbs. Paper Spoilage Saved Daily

Among other important cost-reducing advantages, this cab-operated crane with motorized roll grab in a large paper warehouse, cuts damage losses by 1% of total tonnage handled. Approximately 150 rolls weighing 750,000 lbs. are handled daily.



Foundry Jumps from 3 Heats to 8 Daily

With no increase in man power, the installation of an inexpensive Cleveland Tramrail handpropelled system in a small brass foundry, made a terrific difference in their operations. It made possible 8 heats a day instead of 3, formerly usual. Despite more than double output, the men are less fatigued now at the end of a day.

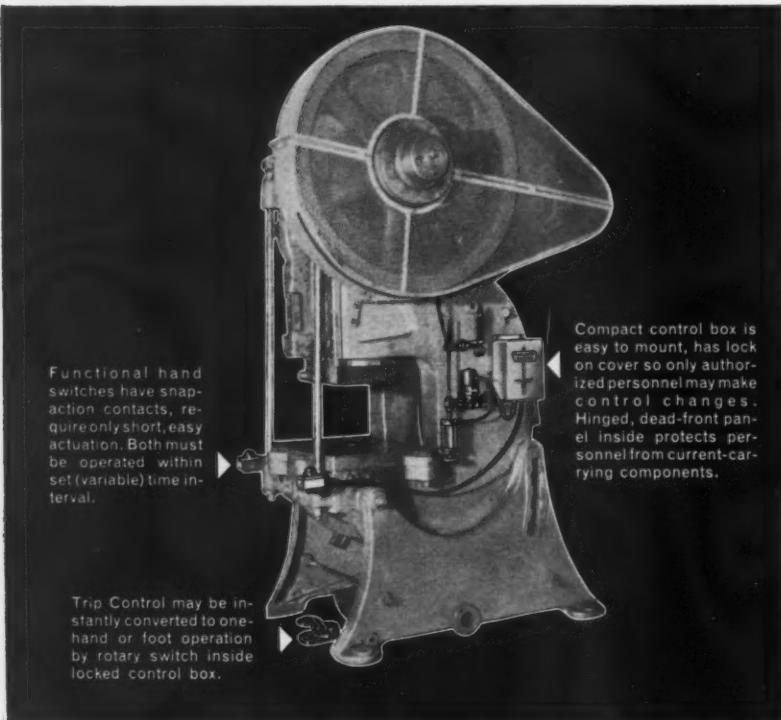
Increases Roll Storage Capacity 50%

The 400-lb. cloth rolls in foreground could only be piled two high until the Tramrail bridge was installed. Now one man can pile them three high easily. He can also deliver them to other parts of the building on the bridge and overhead track, directly without rehandling, thus cutting cost in this way, too.

... for more details, circle No. 7 on Reader Service Postcard

MICRO precision switches

...THEIR USE IS A PRINCIPLE OF GOOD DESIGN



Increase production...3 ways... with MICRO SWITCH Trip Controls

MICRO SWITCH Trip Control will speed production and provide safety to the operator and equipment on any power machine that will lend itself to two-hand control.

1 Less operator fatigue: Simple direct operating motions, feather-touch finger-tip operation of the control switches, and the absence of gates, harnesses or sweeps keep the operator fresh and alert.

2 Increased operator confidence: Without worry over personal safety, operators soon develop a smooth, time-saving "load," "trip," and "unload" sequence.

3 Instantaneous electrical actuation of the clutch: Saves time on every operation.

SEND FOR
CATALOG 65 TODAY
Gives complete description of all controls and clutch actuating equipment.



Outstanding safety features

Reduces chance of accidental operation. Operation can result only when control system is functioning properly. The control becomes inoperable if a component fails.

Control cannot be "cheated" for even one stroke: If one switch is tied down or broken, the control will automatically kick out.

Interlock prevents accidental power stroke during set-up. Operators, set-up men, and expensive dies are protected during set-up. The interlock prevents an unexpected stroke when the motor is started up again.

There is a MICRO SWITCH Trip Control distributor near you. Write us for his name and address.

MICRO SWITCH

A DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR COMPANY



In Canada, Leaside, Toronto 17, Ontario • FREEPORT, ILLINOIS

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WESTERN INDUSTRY — December 1956

MICRO SWITCH Trip Controls have wide range of uses

These controls offer a choice of desirable single-stroke control for positive mechanical clutch machines and automatic cycling control for friction clutches and hydraulic and pneumatic equipment.

FOR SMALL PRESSES

Provides fast, safe, effortless operation of small two-hand presses, riveting machines, etc.

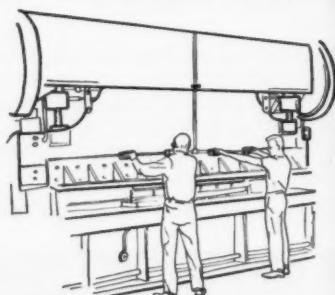


ONE HAND—IF NECESSARY



Where one hand is required to hold stock in a protected or enclosed die, control is quickly converted to one-hand operation.

FOR USE ON LARGE PRESSES



Makes operation of large presses safe and less tiring. Any number of operator stations may be "wired into" the control circuit.

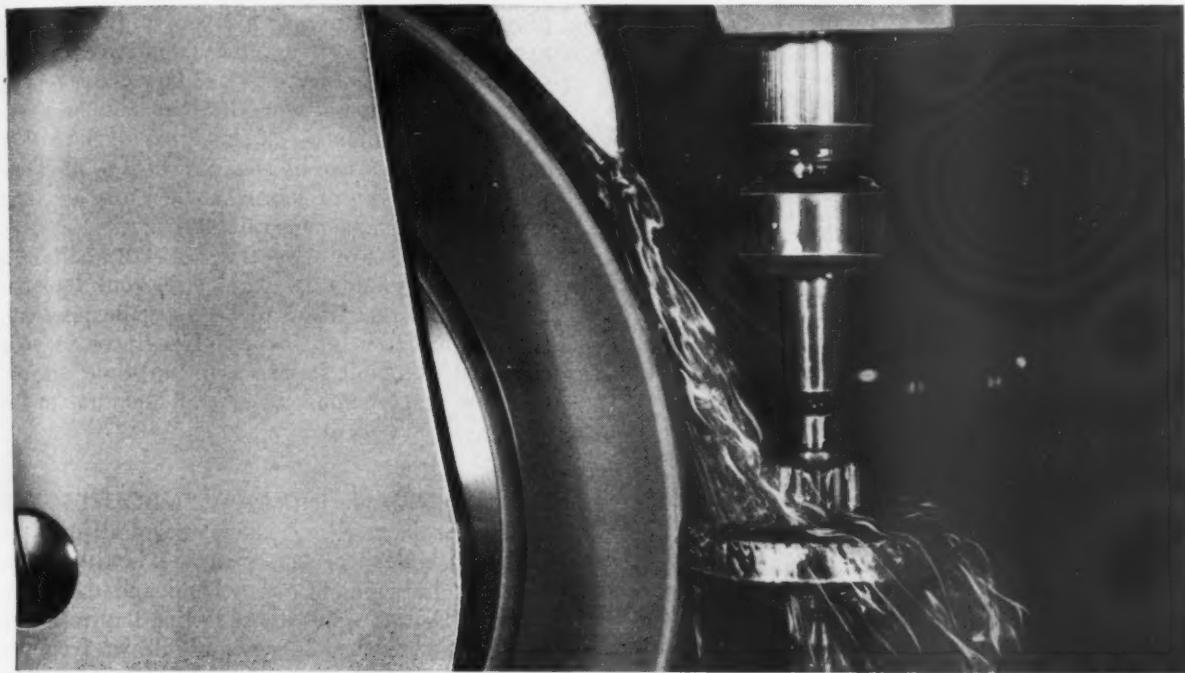
STANDARD ENGINEER'S FIELD REPORT

PRODUCT CALOL CUTTING FLUIDS

FIRM WESTERN GEAR CORP.

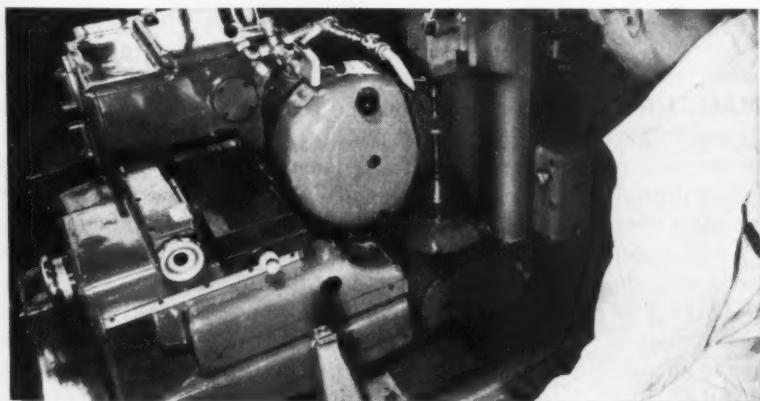
Lynwood, Calif.

Calol Cutting Oil prevents burning of guided missile gears



Calol Cutting Oil keeps this 1800-rpm abrasive wheel from burning guided missile control gears as they are ground to close tolerances on Reishauer precision grinder. Western Gear Corp. tried various other

lubricants, finally settled on economical Calol Cutting Oil 210TA because it eliminates burning during high-speed precision grinding. Calol Cutting Fluids do not separate, turn rancid, let work rust.



Swiss-made Machine controls grinding by speed of spindle and pressure of work against constant speed abrasive wheel. On gear shown, total accumulated spacing error between any two teeth is .0001".

Involute form is held to .0002". High cooling and lubricating qualities of Calol Cutting Oil help make this accuracy possible.

Why Calol Cutting Fluids solve metal-cutting problems



- Have high cooling and lubricating qualities—increase tool life
- Assure precision finishes
- Additives protect against extreme pressure, corrosion and rust
- Very stable—will not separate or turn rancid
- Specialized products for every metal-cutting operation

For Full Information contact your Standard Fuel and Lubricant Engineer or Representative, or write 225 Bush St., San Francisco, Calif.



TRADEMARK "CALOL" AND
DESIGN REG. U. S. PAT. OFF.

STANDARD OIL COMPANY OF CALIFORNIA

... for more details, circle No. 9 on Reader Service Postcard

**VIEWS &
COMMENT**

WHAT'S YOUR TOUGHEST OPERATING PROBLEM TODAY? It's probably a different one than you were wrestling with at this time last month . . . or six months ago. And it's probable also that you recall seeing material in WESTERN INDUSTRY sometime during the past year that would be helpful right now . . . but in what issue?

We've added something new this month to reinforce your faltering memory—a comprehensive and easy-to-use index of all 1956 WESTERN INDUSTRY article material (on pp. 103-106).

And here's an idea: If you want to take a look at articles you missed or that you want in your files for future reference, obtain the issue and page number from the new annual index. Then, jot this down on the WI Reader Service Postcard (page 69), and we'll be glad to send you tearsheets of the articles, at no charge, as long as our supply lasts.

•

WESTERN PLANTS, LARGE AND SMALL, HAVE A PARTICULAR NEED for the talents of men trained in the many-faceted and comparatively new field of industrial engineering. Not only is rapid growth of plants here placing unusual pressures on plant operating executives, but a majority of the West's manufacturing enterprises are newly formed, with the typical organization having no great backlog of plant operating experience. These factors, combined with the typically Western flair for trying to do ordinary jobs in extraordinary ways, lead to an unusual open-mindedness on industrial methodology and equipment application. Despite its desirable aspects, this creates a higher than average need in the West for the benefits available from the utilization of industrial engineering techniques.

Many larger Western plants have already established industrial engineering departments, but only a few employ enough IE's to handle the fluctuating volume and surprising variety of jobs logically falling to this function. Relatively few small West-

ern plants are yet utilizing the services of trained industrial engineers, apparently because too little is known about the IE function and its costs.

A series of articles in WESTERN INDUSTRY last year was devoted to a detailing of why and how small plants could afford the "luxury" of hiring full-time industrial engineers, even where total employment was just four or five people. But that was just half of the story. Since then, we have discerned a widespread and chronic lack of knowledge among Western plant operating men about industrial engineering consultants—on the types of jobs they can do, how they can be engaged, how to pick one for a certain type of job, what the costs are, and what the possible benefits can be.

At the request of WESTERN INDUSTRY editors, a noted Western industrial engineering consultant has prepared factual answers to these specific questions. If there has been no industrial engineer in your plant yet—on your staff or as a part-time consultant—we suggest your thoughtful attention to his discussion on page 42.

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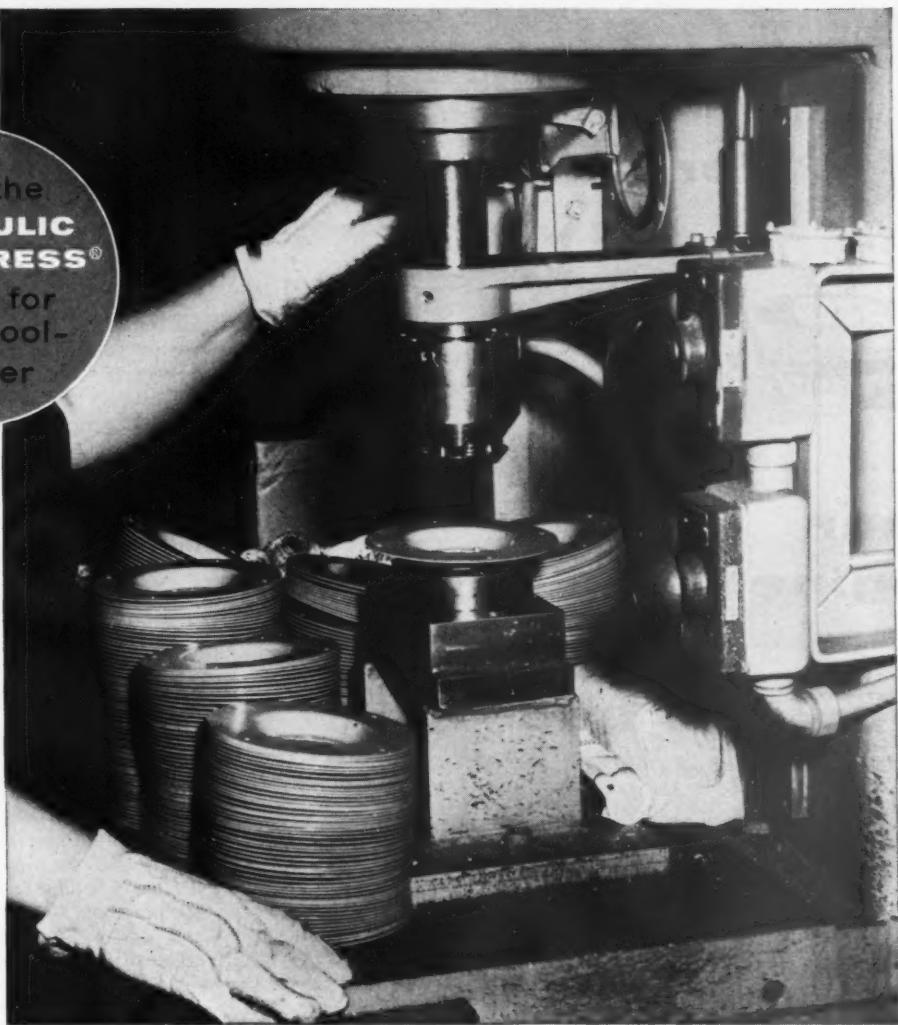
THE AMERICAN INDIAN SYMBOLIZES THE WEST—in the minds of cinema-goers all over the world who believe the American West is still nothing more than Indian-and-Cowboy Land, and to the tourists from Eastern states whose lasting impression of the wide open spaces is inevitably drawn from the one-time barter for a Navajo blanket alongside a dusty New Mexico road. To us in the West, too, the Indian is a symbol but we visualize him differently as confining himself to a remote reservation.

This latter fact no longer fits our fancy. World War II started the big change, with many Indians entering the Armed Forces or going to work in defense plants. A good proportion stayed "off the reservation" after the cease-fire, but few others left to join them—until a couple of years ago. New opportunities for education, gentle persuasion by Uncle Sam, plus new self-confidence and a healthy curiosity among these people have combined to stimulate an accelerating exodus from the reservations.

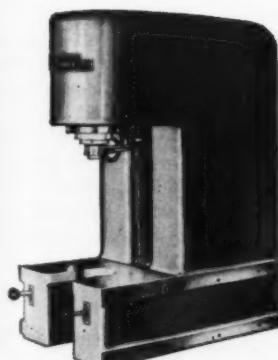
As one result, a lot more Indians are showing up these days at industrial personnel offices. Aware of this phenomenon, the editors of WESTERN INDUSTRY knew it would be of value to you to know about the capabilities of Indians as workers in your plant—Are they "problem employees"? Do they have any special aptitudes or shortcomings?

To obtain realistic answers to these questions, WESTERN INDUSTRY surveyed a number of plants throughout the West to gather experience data from those already employing Indians—with the results of the survey appearing on page 39 of this issue. You'll see why we predict that "symbolizing" the Western plant of tomorrow will be the American Indian on the production line!

How the
HYDRAULIC
MULTIPRESS®
works for
Whirlpool-
Seeger



MULTIPRESS® assembles automatic washer parts daily...by the thousands



8-ton Denison
hydraulic Multipress

All automatic washers, made at the rate of several thousand per day by Whirlpool-Seeger Corporation, require a stamped steel brake disc.

Rivets assemble the stamped discs to flanged hubs die cast in zinc alloy. The two parts are positioned together, rivets passed through small holes in the bottom of the stamping, projecting inside the dished portion of the disc. The four rivets are then upset, fastening the brake disc permanently to the hub.

With the 8-ton Denison hydraulic Multipress, the riveting operations are performed with perfect uniformity. Smooth, controlled hydraulic action of the ram avoids a sharp blow, yet applies the proper pressure to the rivets.

Your Denison representative can show you how to improve your manufacturing operations, increase quality, cut production costs. Write Denison Engineering Division, American Brake Shoe Co., 1184 Dublin Road, Columbus 16, Ohio.

HYDRAULIC PRESSES • PUMPS • MOTORS • CONTROLS

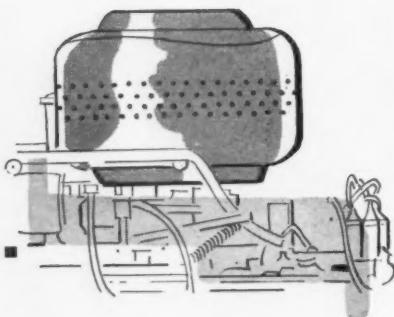
DENISON
HydrOILics

... for more details, circle No. 10 on Reader Service Postcard



for raisins

**or car
engines . . .**



you can use

CF&I INDUSTRIAL WIRE CLOTH

Versatile CF&I Industrial Wire Cloth helps assure the housewife of stem-free raisins and the automobile driver of an efficient vehicle. For raisin processors stem their raisins with a special CF&I Wire Cloth that has both round and square wires . . . and other specialized types of cloth are used in air filters for automobile engines.

If you make raisin-stemming equipment . . . air filters . . . or any other product which screens, filters, grades, cleans, processes or requires reinforcement, it'll pay you to get the complete story on CF&I Industrial Wire Cloth. Produced to your most exacting specifications, CF&I Industrial Wire Cloth can be

supplied in a wide variety of weaves and meshes made from ferrous or non-ferrous metals. Get the complete story from your CF&I representative today.

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CF&I OFFICE IN CANADA: Toronto
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. . . for more details, circle No. 11 on Reader Service Postcard

LETTERS

More Power Directory copies

EDITOR—We have read with interest the September 1956 Annual Plant Power Issue of WESTERN INDUSTRY. We were particularly interested in the Industrial Power Equipment Buyers' Directory included in the issue, and we are wondering if it is at all possible to receive some extra copies of either the Buyers' Directory as a separate section or the complete magazine.

We would like very much to distribute this directory to certain of our key personnel for their information and guidance in the selection of electrical suppliers.

JAMES W. IRVING
Purchasing Department
Sego Milk Products Co.
Salt Lake City, Utah

(We are pleased that this is a typical reaction to WI's first Annual Plant Power Issue and the extensive industrial power equipment directory it contained. Many such comments assure that this new special service for the West's plant operating executives will be a regular part of our publishing program. Extra copies of any issue of WI are available, while they last, at 50c per copy. The "Power" directory, and other directories published in issues of WI, are not available bound separately.—Ed.)

"Plastic surgery" limitations?

EDITOR—After reading "Plastic surgery" repairs tanks" in the July WESTERN INDUSTRY, we became interested in the possibilities of using the epoxy resin in our copper smelter maintenance.

Could you have the following information furnished us? (1) Literature further describing epoxy resin and its uses. (2) The effect upon the epoxy resin in making repairs on steel in the temperature range of 200-500 deg. F. (3) Possible suppliers in our area. (4) The effect of sulphates, sulfuric acid and sulfur dioxide gas on epoxy resin.

F. R. RICKARD
Smelter Engineer
Phelps Dodge Corp.
Ajo, Ariz.

(Editorial material will appear in WI soon describing not only the possibilities for use of epoxy resins in repairing industrial tanks and pipes, but also the limitations of this promising new technique.—Ed.)

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Another first for American! The exceptional thermal and chemical properties of Teflon are combined with low, cold flow characteristics to give you a gasketing material never before available.

With thermal stability up to 420°F. Vistex with Teflon eliminates undesirable lateral plastic flow with excellent stability to corrosive gases, liquids and virtually all chemicals at low and high temperatures.

Vistex with Teflon, with tensile strength of 5,000 psi, has very high tear value, will not ravel or fray, has very good cutting properties. Seals with minimum pressure on polished or irregular surfaces.

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GENERAL OFFICES:
GLENVILLE, CONN.



A typical Murray drilling rig powered with
220-hp. LRO Waukesha and 230-hp. V-12 Le Roi engine.

How a steak dinner saved me \$1,000 a day!

by L. D. Murray, Murray Drilling Co., Houston, Texas

"Engine failure due to overheating used to be a big problem when I was drilling in West Texas... downtime was costing me as much as \$1,000 a day.

"Conditions were the worst I've ever encountered before or since. There were no prevailing winds to head the engines into. We were drilling 13,700-foot wells at an altitude of 4,200 feet and temperatures often ranged upwards of 100°. Consequently, our engines were constantly running well above the boiling point and at times they'd pull the mercury down to 9 or 10 inches. You can guess the rest...with expenses running about \$25,000 a year on each of six engines, we were not exactly getting rich.

"Well, one day I told a friend of mine about my engine troubles, and he told me if I'd buy him a steak he'd solve my problems. So I bought him that steak (it was even big by Texas standards), and he told me to try Union's T5X Motor Oil... just that and nothing more. So before we'd finished lunch, I ordered five barrels of T5X sent out to the rigs.

"From that day on, our engine troubles were over. Water temperatures held at 190° and oil consumption dropped from 10 gallons to 1, sometimes even half-a-gallon per day.

Instead of changing oil every Sunday morning, we found we could run T5X Motor Oil 500 hours, changing it and the filters every third or fourth Sunday. And would those engines deliver on T5X! If I had to shut one down for any reason, the other two would pull the load.

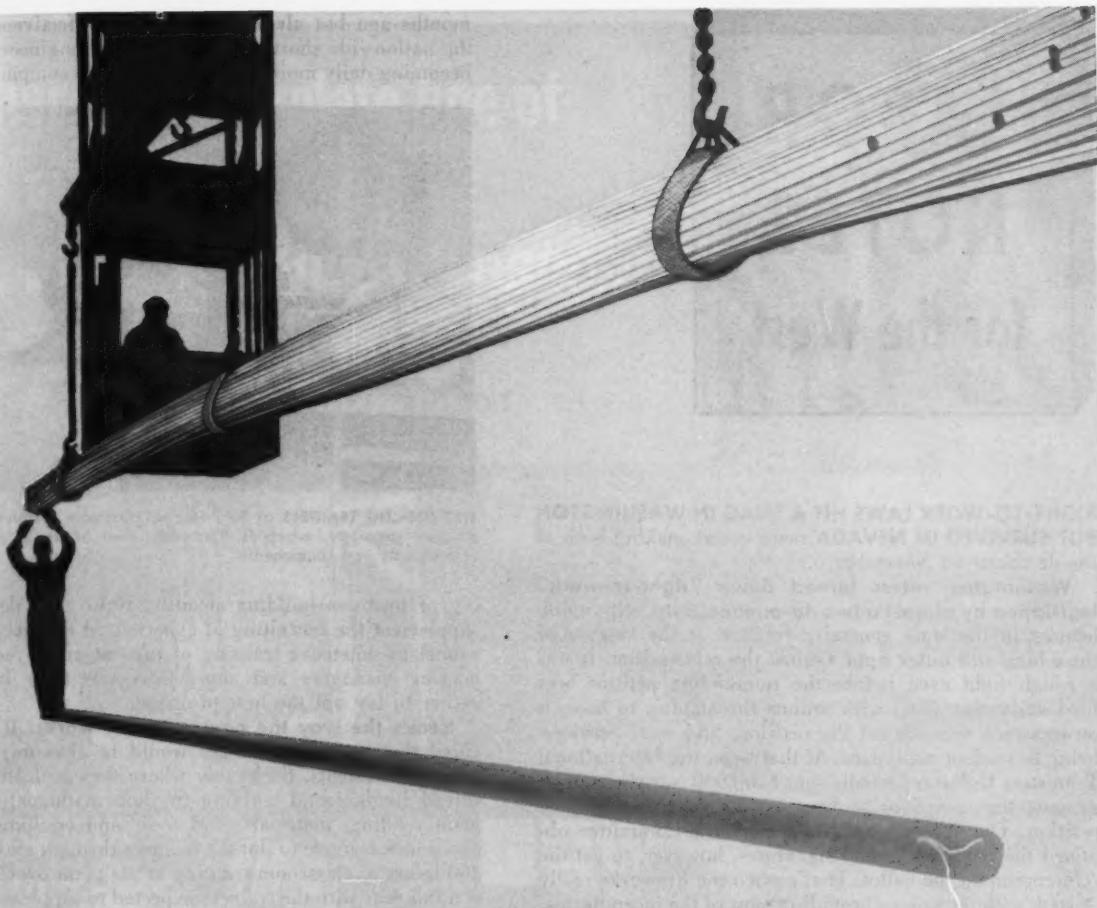
"To make a long story short those engines stayed on the line for three years after that, using only T5X, and the only expense aside from routine maintenance was an occasional tuneup. I think that Union T5X is so far ahead of any other motor oil, it's impossible to compare them."

What more can we add except to remind you that T5X, the amazing purple motor oil, is immediately available from your nearby Union Oil representative.

UNION OIL COMPANY **76**
OF CALIFORNIA

Los Angeles: Union Oil Bldg. • New York: 45 Rockefeller Plaza • Chicago:
1612 Bankers Bldg. • Philadelphia: Eastwick Ave. & Edgewood St.
Dallas: 313 Fidelity Union Life Bldg. • Kansas City, Mo.: 612 W. 47th St.
New Orleans: 644 Nat'l Bank of Commerce Bldg. • Boston: 214 Harvard Ave.
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WESTERN INDUSTRY — December 1956



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SEAMLESS STEEL TUBING

Pacific Tube Company can now supply you with precision, cold-drawn Seamless Steel Tubing in absolutely straight lengths up to 58 feet long. Special new equipment, including new pickling tanks 60 feet long makes this feat possible. The longest draw bench in the country helps, too!

For your protection and better tubing, new high-pressure hydrostatic testing is used.

A wide range of sizes is quickly available in many chemistries in Stainless, Seamless Carbon and Alloy Tubing...cold-drawn to your exact specifications.

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Pacific also manufactures...
COLD-DRAWN BARS
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Precision drawn to rigid specifications
from $3/16"$ thru $3\frac{1}{2}"$ in many
chemistries including Ledloy Grades A & B.

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RIGHT-TO-WORK LAWS HIT A SNAG IN WASHINGTON BUT SURVIVED IN NEVADA,

with voters making both of the decisions on November 6.

Washington voters turned down "right-to-work" legislation by almost a two-to-one majority, with union leaders in the state generally jubilant at the success of their long and bitter fight against the referendum. It was a rough fight even before the referendum petition was filed early this year, with unions threatening to boycott businessmen who signed the petition, and with petitions being burned in mailboxes. At that time, the International Teamsters Union reportedly sent \$100,000 into the state to support the campaign to keep people from signing the petition. The Washington Right to Work Committee obtained the required 50,000 signatures, however, to get the referendum on the ballot. That's when the fireworks really started, with the unions providing most of the incendiaries. The issue seemed doomed to failure early in the campaign simply because few office holders, politicians, or businessmen dared to make public statements in favor of its adoption. Intent of the referendum was stated in its first section: "Be it enacted by the people of the State of Washington that the right of a person to seek, obtain, or retain employment shall not be denied or abridged because of membership in or non-membership in any labor organization."

An attempt to repeal Nevada's present right-to-work law was rejected by the state's voters by a fairly slim four-to-three majority. Nevada is unique among Western states in that it has no laws (Little Wagner or Taft-Hartley Acts) regulating union activity or curbing abuses of the membership, business of the public, except its right-to-work law, passed in 1952, which simply protects the citizen in his or her right to join or not to join a labor union. In a 1954 referendum, Nevada voters had also chosen to retain the law. Other Western states having forms of right-to-work laws are Arizona and Utah.

•

EXPERIMENTS IN TRAINING EMPLOYEES ARE PAYING OFF FOR ROHR AIRCRAFT, which now takes pride in having probably the most fully developed training program in the Western aircraft industry. From in-plant technical courses to its tuition refund plan for those who attend nearby high schools and colleges, Rohr has taken giant steps toward helping its industrial employees advance themselves in their chosen careers.

Latest addition is the firm's "Engineering Training Program," started to some extent as an experiment five

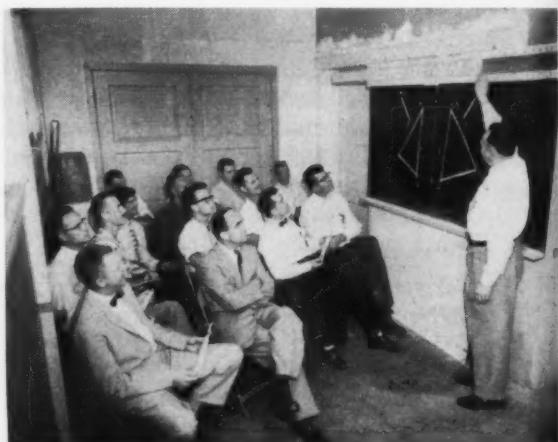
months ago but already proven in its effectiveness. With the nationwide shortage of people with engineering skills becoming daily more acute, and with the company's back-



ENGINEERING TRAINEES at Rohr receive classroom instruction in descriptive geometry, which is frequently used in design of aircraft powerplants and components.

log of business building steadily, Rohr men decided to supplement the recruiting of experienced engineering personnel by intensive training of present employees. Engineering managers and supervisors put their heads together to lay out the best program.

Here's the way the new program works: It was decided that potential trainees would be transferred from shop departments, preferably where they had already received fundamental training in shop mathematics, blueprint reading, materials, and tools and equipment. The decision was made to put the trainees through an intensive 400 hours of classroom training at the plant over the span of a full year with the trainees expected to supplement their daily classwork and on-the-job study with homework assigned and corrected by their instructors. Subjects chosen for study were drafting, slide rule, algebra, trigonometry, descriptive geometry, materials, power plants and me-



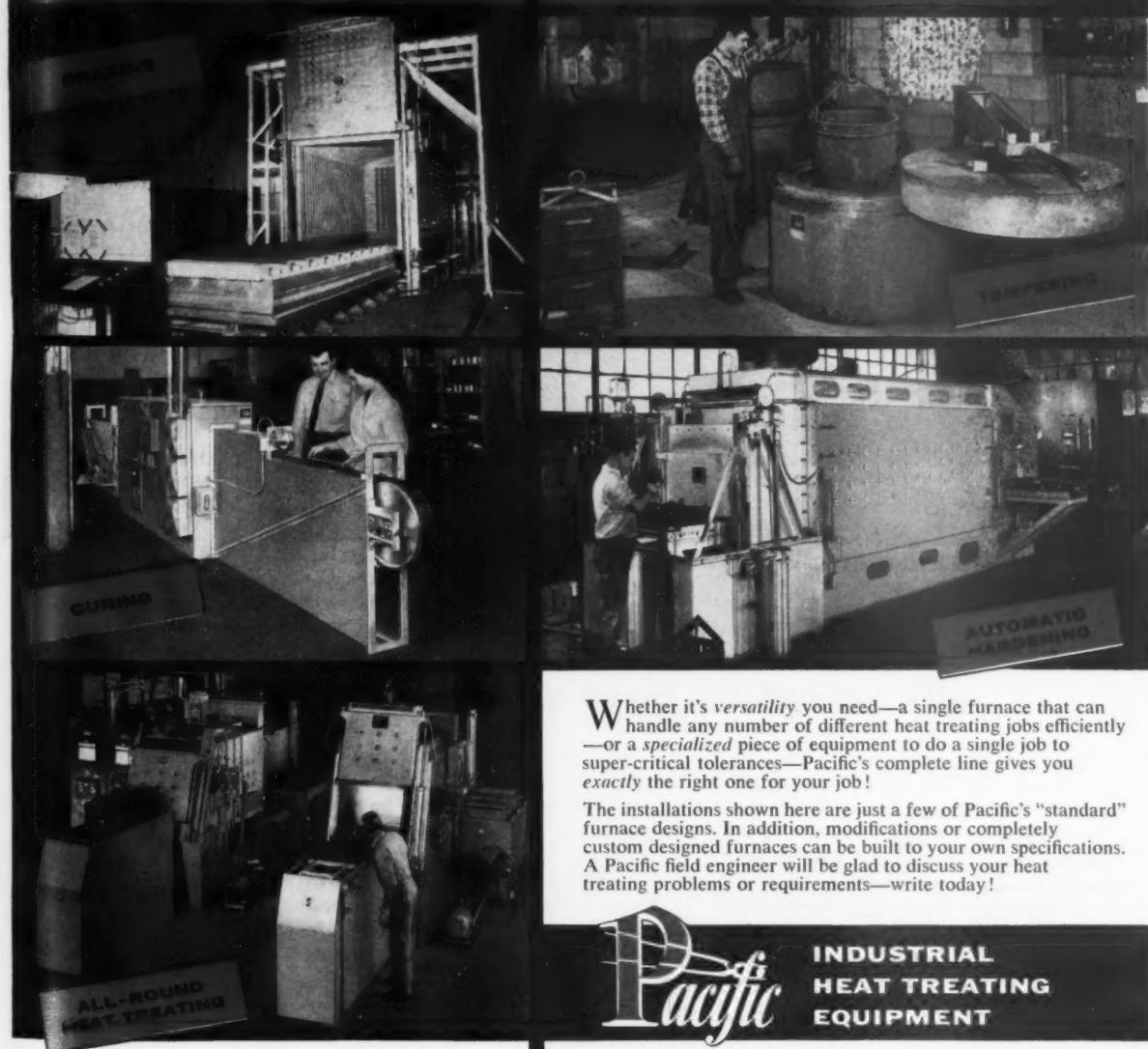
"SLIDE RULE" is one of the ten-course subjects offered under Rohr's new training program, with Training Coordinator L. J. Goldsmith demonstrating here how the slipstick solves problems quickly.

chanics, stress analysis, engineering communication, and engineering standards with all of the subjects given in company classrooms with company instructors. An engineering professor from a nearby college was hired as training coordinator, and also serves as chief instructor.

... continued on page 22

there's a complete line of **Pacific**-built furnaces

...ONE FOR YOUR EVERY
HEAT TREATING NEED!



Whether it's *versatility* you need—a single furnace that can handle any number of different heat treating jobs efficiently—or a *specialized* piece of equipment to do a single job to super-critical tolerances—Pacific's complete line gives you exactly the right one for your job!

The installations shown here are just a few of Pacific's "standard" furnace designs. In addition, modifications or completely custom designed furnaces can be built to your own specifications. A Pacific field engineer will be glad to discuss your heat treating problems or requirements—write today!



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EQUIPMENT**

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Please send me bulletins and specifications on a Pacific Furnace for:

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COMPANY**

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Delivery and shipping facilities at Los Angeles branch. Above: Pipe warehouse

Crane meets all your piping needs with complete local service

Regardless of your location, you can realize the full benefits of Crane quality and service right in your own area. 19 strategically located Crane Branches plus Crane Wholesalers everywhere are at your service.

Everything you need in valves and fittings is available through your local Crane outlet. If it's a staple item, chances are it will be in stock—even in large quantities.

You'll like the quick, convenient over-

the-counter service. You'll also like the prompt, efficient way your telephone "will-call" orders are handled.

Any items not stocked locally will be on their way in double-time from the great Crane factory warehouses in Chicago. So either way, you're ahead with Crane. And with the world's broadest line to choose from, you're sure of getting all your needs.

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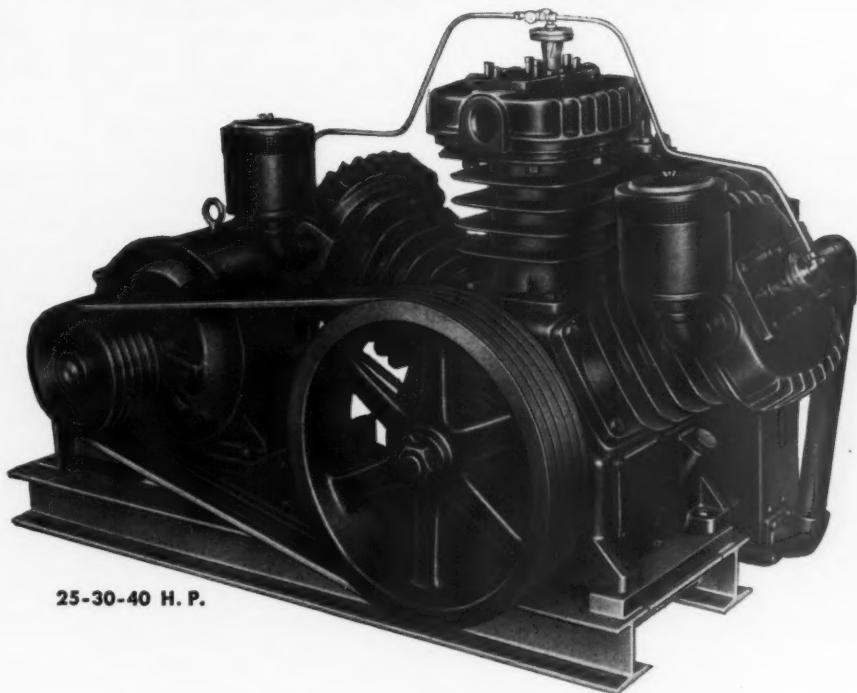
Since 1855—Crane Co., General Offices: Chicago 5, Ill. Branches and Wholesalers Serving All Areas

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WESTERN INDUSTRY — December 1956

THE NEW CURTIS MODEL C-100
TWO-STAGE, AIR-COOLED AIR COMPRESSOR

Provides Higher Operating Efficiency Costs Less to Install



THIS NEW Curtis Two-Stage will deliver more air per minute, per horsepower and per kilowatt hour of electrical energy consumed, thus assuring a saving in your electrical bill.

It's Air Cooled, thereby eliminating expensive water bills and assuring quick and easy installation with no complicated plumbing problems.

The new C-100 embodies all the well-known Curtis engineering features such as centro-ring oiling and Timken Main Bearings.

For complete information write for illustrated folder.



Curtis

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CM-23



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LABOR NOTES

. . . continued from page 18

Rohr already has plenty of other technical training programs underway, well past the experimental stage now, including machine shop training, machine tool planning, plaster, plastic tooling, and optical tooling. Scheduled to start soon are courses in detail parts planning, tool inspection, assembly inspection, and fundamentals of aircraft production.

Rohr's concern for the employee who wants to further his own education is shown not only by the many courses given by the firm, but also through its liberal tuition refund plan. Under this plan, Rohr employees who take college or correspondence courses which relate to work they perform or may logically be called upon to perform for the company receive up to a full tuition refund when they satisfactorily complete the course. Specifically, the tuition refund applicable for college course is 100% if the student receives a grade of "A," 75% for a grade of "B," and 50% for a grade of "C."

EVERYBODY IN YOUR PLANT GETTING MORE THAN A BUCK AN HOUR? Probably they are. Just in case, though, you should know that a number of new Wage-Hour Investigator offices have been opened around the West during the past couple of months to make sure. Men have been especially trained to work out of these offices in

aiding, and investigating, employers and employees affected by the Fair Labor Standards Act which last March 1 raised the national minimum wage to \$1.00 per hour. This applies to all non-exempt employees engaged in interstate commerce or in the production of goods for interstate or foreign commerce, including those whose work is closely related and directly essential to such production. Incidentally, it also requires overtime pay of at least one and one-half the regular hourly rate of pay for each hour worked beyond 40 per work-week, and restricts the employment of children. If you're in doubt about the situation at your plant, write to the regional headquarters of the Wage-Hour Division at Room 329, Appraisers Bldg., 630 Sansome St., San Francisco—now!

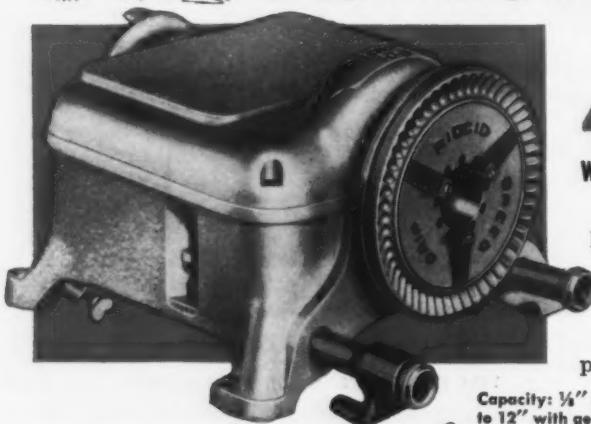
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"**CONFFLICT OF INTEREST**" tips you off to proper conduct for ex-government employees and retired military officers engaged in private industry. Prepared by the Small Defense Industries Assoc., it is No. 2 in a management report series and is authored by Walter F. Pettit, San Francisco, Calif., attorney. Noting that many industrial firms hire military officers and other former government employees, the SDIA outlines the need for such a report by saying, "There is much confusion about the extent of relationship such employees may maintain with federal agencies. Can they act as sales representatives? Can they give advice on handling claims against the government? Fines, jail terms, and lost law suits hang over the heads of those who fail to observe the conflict of interest rules." Containing a guide to proper conduct, the 30-page publication is offered by the association, 3780 West Sixth St., Los Angeles 5, Calif., at a price of \$2.00.



Save Time, Cut Job Costs

Cutting, Threading, Reaming Pipe with this Extra-Speedy



RIGID 504
for Power Threading
Quick-opening self-contained 1" to 2"
threader for faster threading with power
drive. Easy setting to size.

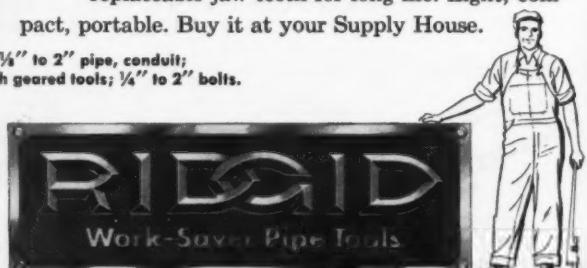


Capacity: 1/4" to 2" pipe, conduit;
to 12" with geared tools; 1/4" to 2" bolts.

RIGID 400A Power Drive

with SPEED CHUCK . . . instant grip, forward, reverse

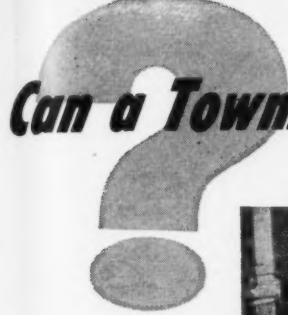
More work more easily when this powerful little power drive turns pipe, conduit or rod for your hand tools. Rapid action Speed Chuck guaranteed to hold tight forward or reverse; replaceable jaw teeth for long life. Light, compact, portable. Buy it at your Supply House.



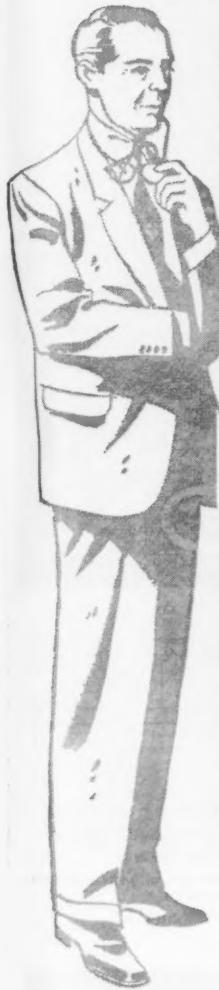
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WESTERN INDUSTRY — December 1956



Can a Towmotor Solve My Handling Problems?



YES!

Towmotor Fork Lift Trucks and Towmotor Job-Planned Accessories are "tailor-made" for your particular application *in many ways*. Soundly engineered by materials handling specialists, the Towmotor line includes 15 different models and more than 60 interchangeable attachments, for *every* handling need.

Ask your nearest Towmotor Representative to show you what Towmotor equipment can do to speed your materials handling, cut man-hour costs and make maximum use of storage space! . . . or write for Certified Job Studies covering *your* industry. **TOWMOTOR CORPORATION, Div. 6712, 1226 E. 152nd St., Cleveland 10, Ohio.**

Read how other companies use Towmotor Equipment to Cut Costs!

Brick Manufacturer: Ask for Job Study #107
Cotton Warehouse: Ask for Job Study #109

Transfer Company: Ask for Job Study #111

Fruit Grower: Ask for Job Study #110

Metals Plant: Ask for Job Study #108

TOWMOTOR

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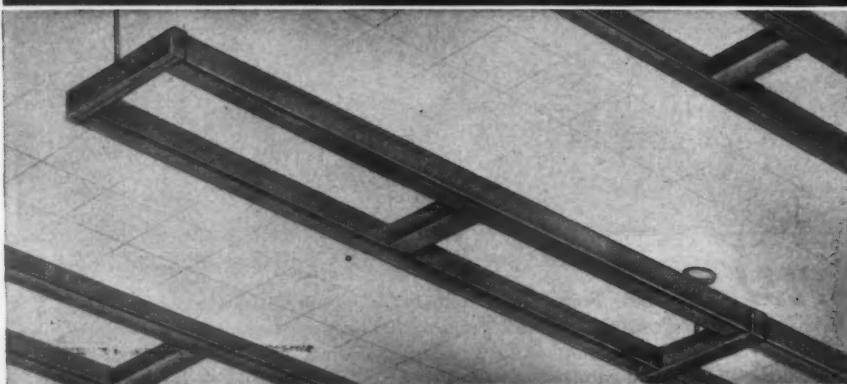
®

THERE'S ONLY ONE FORK LIFT TRUCK CALLED TOWMOTOR

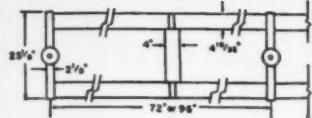
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style
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in
lighting

NEW SMOOT-HOLMAN LUMINAIRE
PERFECT VISION



PAT. PEND.



features:

- Utilizes new 800 MA high output lamps
- May be mounted within 12" of ceiling
- Meets ASA school standards
- High adaptation level with low brightness and brightness ratios
- Flexible in arrangement

Smoot-Holman continues its leadership in lighting with the "new as tomorrow" Perfect Vision indirect luminaire. Here again is Smoot-Holman quality, high efficiency and economy—actually gives *more light per dollar* than ever thought possible.

Investigate the many advantages of this excitingly new, architecturally beautiful luminaire. Contact your local Smoot-Holman office or write direct for Catalog PV-288.

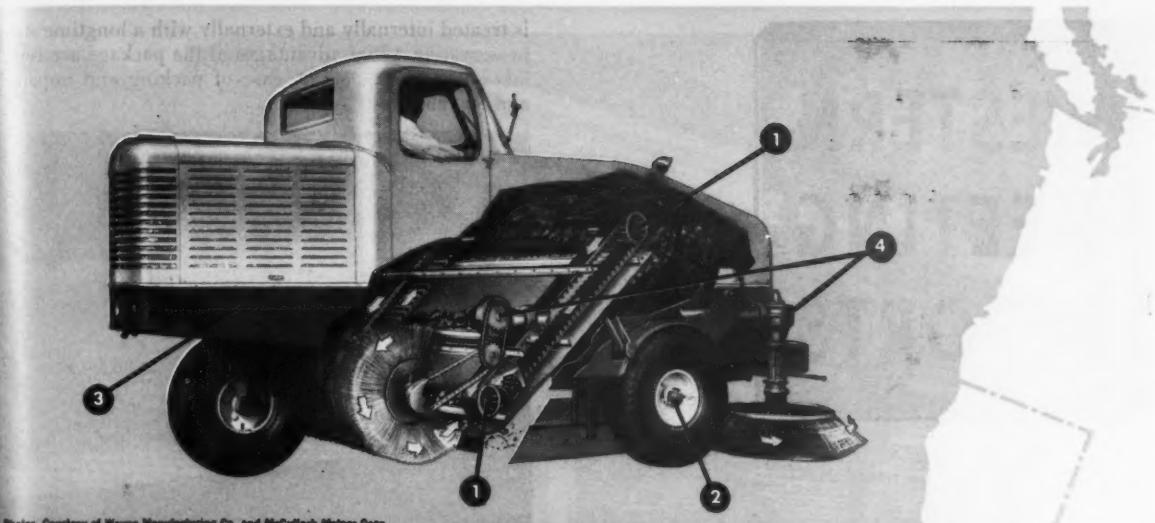


SMOOT-HOLMAN

Inglewood, California

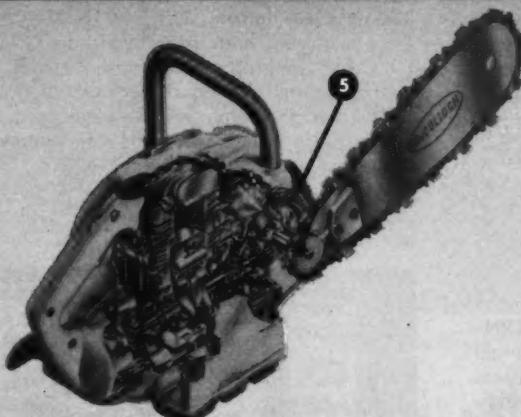
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from A to Z in AZUSA



- 1 Elevator sprocket hubs
- 2 Front axle
- 3 Rear axle pivot
- 4 Ring gear spindle
- 5 Gears

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UPSET FORGINGS

Whether an axle for a street cleaner, or a special gear for a chain saw, AmForge is prepared to forge it. Just like the philosophy of AZUSA's founding fathers in choosing a name for their town.

"Build everything from A to Z for the USA, AmForge is ready with equipment and experience to help you solve your forging needs."

Our engineers are prepared to work with you. Please phone us collect when you have a "forging" problem.

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3RD WESTERN PLANT MAINTENANCE AND ENGINEERING SHOW, scheduled for San Francisco at the Civic Auditorium June 11-13, will have a 35% increase in exhibitors, according to Saul Poliak of Clapp & Poliak, the show's producers. In forecasting the activity at the show, Poliak also announced an expected 2,500 increase in attendance of plant operating and engineering men in the West. Last held in 1955, the event drew 6,000 visitors. Poliak stated that the "increased number of automatic operations—indeed, entirely automatic plants—in the West," accounts for the expected increase in show activity. Scheduled to run concurrently is the 3rd Western Plant Maintenance and Engineering Conference, which will be designed to cover currently pressing problems presented in operating modern plant facilities.

THREE PACKAGING FIRST PRIZES WENT TO WESTERNERS (out of a possible seven) at the recent 11th Annual Protective Packaging and Materials Handling Exposition. Traveling east to St. Louis, Mo., to attend the exposition and enter their packaging designs, Western packaging engineers also walked off with two 2nd place prizes and three honorable mentions. The competition, sponsored annually by the Society of Industrial Packaging and Materials Handling Engineers, attracted 150 entries in seven classifications. Here's how Western packaging ingenuity came out:

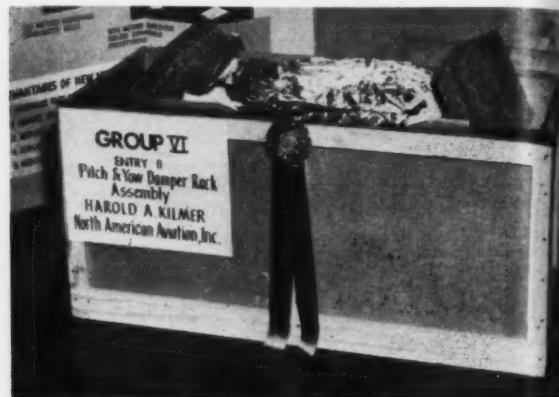
W. E. Christopherson of Douglas Aircraft in Santa Monica, Calif., won first prize in Group V (General Pack-



A REUSABLE drum-type container for a hydraulic pump won first prize in the General Packaging Group at SIPMHE's annual contest, for **W. E. Christopherson** of Douglas Aircraft in Santa Monica, Calif.

aging) with a reusable drum-type container for a hydraulic pump. Die-cut pad blocks and barrier material supported the pump in the drum. The pump itself—a military unit—

is treated internally and externally with a longtime storage preservative. Chief advantages of the package are reduced labor and material cost, ease of packing and unpacking, and its reusability.



A CORRUGATED FIBREBOARD EXPORT SHIPPING UNIT was first prize winner in the Export Package Group. It was designed by **Harold A. Kilmer** of North American Aviation, Inc., in Downey, Calif., for shipping of a pitch and yaw damper rack.

Harold A. Kilmer, North American Aviation, Inc., Missile Development Div., in Downey, Calif., walked away with the first prize award in Group VI (Export Packages). Winning the award for him was his design of a corrugated fibreboard package for export shipping of a pitch and yaw damper rack assembly. Advantages in his design are a reduction of 66% in dunnage weight, 25% in dessicant, 22% in packing time and 16.8% in package cost. Package consists of expanded polystyrene, corrugated fibreboard, barrier, paper-overlaid veneer and hair latex.



AN ELECTRONIC COMPONENTS HANDLING SYSTEM designed by **Roger S. Watson** of Northrop Aircraft Co. in Hawthorne, Calif., won first prize in the Materials Handling Group. Moulded Fiberglas tote boxes with specially designed inserts are used to handle delicate parts produced.

Roger S. Watson, Northrop Aircraft Co. in Hawthorne, Calif., came away with first prize in Group VII (Materials Handling). His prize-winning design was for an electronic component handling system consisting of moulded Fiberglas reinforced plastic tote boxes, supplied by G. B. Lewis Co. in three sizes and colors. Features of the tote box design are removable polyurethane cushion inserts, pads, or multiple cavities fabricated to fit tote pans and hold various size delicate parts, a flexible polyethylene cover fabricated to fit over entire tote box and equipped with elastic shock cord to hold the cover snugly under the

... continued on page 30



More than fourteen-hundred fixtures light Dalmo Victor's new plant at Belmont, California

New "Certified Lighting" tailors light to the task for *Dalmo Victor employees*

Nearly 3000 fluorescent lamps spread soft, glare-free light over the 138,000 square foot Dalmo Victor plant. And the employees heartily approve!

"Now I can see what I'm doing without confusing shadows," comments a drill press operator.

"Even after a full day's work, I can read in the evening without tiring my eyes," says a tool and die maker.

Dalmo Victor management is equally enthusiastic:

"We've had a marked decrease in complaints about eyestrain and headaches," reports P. H. Friedman, manager of man-

ufacturing. "We know this has a positive effect on employee morale and productivity!"

For more information on the advantages of "Certified Lighting" send for the free fact book with coupon below.

**Northern California Electrical Bureau
1355 Market Street, San Francisco 3, California**

Without cost or obligation, please send me the "Fact Book on Certified Lighting for Industry."

Name _____ Company _____

Address _____ City _____ State _____

NORTHERN CALIFORNIA ELECTRICAL BUREAU

This advertisement sponsored by Pacific Gas and Electric Company

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a new "super-service" CF TERMINAL

These new time-saving features speed your Portland LTL shipments:

- **Double the number of loading bays.** More than 160 freight-carrying units can be spotted at the dock at one time.
- **1,700-foot endless conveyor line** moves running carts to proper loading bays, increases speed of less-than-truckload shipments through terminal.
- **70,000-sq.-ft. terminal loading area** makes it possible to move 8,600,000 pounds of freight through the terminal in a 24-hour period.
- **40 per cent increase in radio-dispatched pickup and delivery fleet** and expanded number of city-based trucks gives shippers faster service from shipping door to terminal.

* Less-than-truckload.

** We like large shipments, too.

Proof again that CF "loves LTL"** is Consolidated Freightways' new terminal in Portland, Oregon, which was *designed* for LTL shipments. It provides you faster, more efficient service on all your LTL shipments. This "super-service" terminal, with more than doubled freight handling capacity, was built to meet your growing needs.



Portland's new terminal is typical of CF's modern western facilities. For the best in motor freight service, route all your shipments** via CF.

Call your local CF terminal for complete information, or write Customer Service Dept., Consolidated Freightways, Portland 8, Oregon, for routing map and list of points served.



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WESTERN INDUSTRY — December 1956

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Plant, Research Laboratories and World Headquarters



BETTER LINE FASTER
Low Temperature
EUTECTIC
WELDING ALLOYS
STRONGER WELDS

EUTECTIC

Welding News

PUBLISHED BY EUTECTIC WELDING ALLOYS CORPORATION, 40-40 172 STREET, FLUSHING 58, NEW YORK, N. Y.

Cracking Problems in Cast Iron Weld Deposits Examined

Production and maintenance welding of cast iron has been practiced for decades. Until recently, it was considered an art requiring considerable welding skill because of cast iron's poor inherent properties. But continued exploration by "Eutectic" has made the techniques of cast iron welding capable of scientific control.

At the National Metal Show, attention was again directed to "Eutectic's" advanced research in this field. Joseph F. Quaas, Director of Manufacturing and Production at "Eutectic," addressed the fall meeting of the American Welding Society in Cleveland, Ohio, on "Aspects of Crack Sensitivity in Machinable Cast Iron Deposits." Mr. Quaas discussed the problems of welding both gray and nodular cast irons. He analyzed various types of coated electrodes, such as 99 per cent nickel, 55 nickel-45 iron, and monel grades, and recounted the incidence and degree of cracking that occurs with these electrodes and with electrodes of various coating formulations. This work helped to perfect the new, non-cracking, high tensile, machinable electrode for cast iron, Xyron 2-25. Hardness surveys, tables on physical properties and chemistry of test blocks, and macro and microphotographs depicting various weld structures were made available to the audience.

Results of "Eutectic's" research and development program are apparent in the newest cast iron electrodes and rods, such as EutecRod 144FC Super, which welds gray and alloyed cast irons at lowest possible application temperatures and produces dense, sound weld deposits, with minimized warping, distortion, stress, and embrittlement caused by conventional high heat cast iron rods.

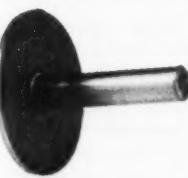
"EUTECBOR" #9 PRODUCES "LOW HEAT INPUT," LEAKPROOF WELD

"EutecBor" #9 recently provided an answer to the problem of joining sections of steel tanks without the use of flux, and without fusion of the base metal, so that the joint would withstand Freon gas and pressure of 300 lbs.

Leakproof re-joining of the tank sections was necessary. Conventional welding rods were found unsatisfactory because of their high application temperatures. "EutecBor" #9, embodying Eutectic's "Low Heat Input" process, produced a distortion free and absolutely leakproof joint.

"EutecBor" #9 has excellent corrosion resistance to various atmospheres and many acids. It can be used on steel, cast iron, high chromium and nickel alloys. Fusion of the surface of the base metal is not required. "EutecBor" #9 is very fluid and will flow through a lap joint. (A-21)

EUTECROD 1801 SAVES 60% IN PRODUCTION COSTS



A company manufacturing book binding machinery now saves 60% of the cost of manufacturing a component part by using EutecRod 1801.

The company fabricates hundreds of these parts weekly. Instead of machining the part from one piece of stock, the company now uses EutecRod 1801 to join a thin blank of monel to a piece of drill rod.



analyzed various types of coated electrodes, such as 99 per cent nickel, 55 nickel-45 iron, and monel grades, and recounted the incidence and degree of cracking that occurs with these electrodes and with electrodes of various coating formulations. This work helped to perfect the new, non-cracking, high tensile, machinable electrode for cast iron, Xyron 2-25. Hardness surveys, tables on physical properties and chemistry of test blocks, and macro and microphotographs depicting various weld structures were made available to the audience.

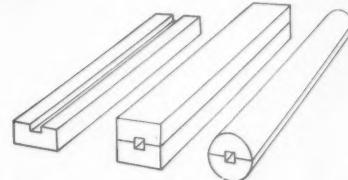
pany \$1000 and two months "downtime." A ratchet wheel on a piece of equipment was believed unrepairable and a new wheel was ordered: cost, \$1000; delivery time, 60 days.

A Eutectic District Engineer advised repair with EutecTrode 680 AC-DC, a high tensile electrode for high alloy and carbon steels which produces a dense, porosity free weld. Use of EutecTrode 680 AC-DC resulted in a weld of high strength and great corrosion and heat resistance; the order for a new wheel was cancelled.

(A-24)

EUTEC-TINWELD SOLVES UNUSUAL SOLDERING PROBLEM

A manufacturer utilized Tinweld's easy application and high strength to solve an unusual problem—the fabrication of a die to cut tungsten wire. He first joined two pieces of grooved steel with Tinweld, a paint on solder type paste. Tinweld's good wetting qualities and freedom from spatter prevented any solder from entering the groove.



The square of steel was then turned to a cylinder and heated, the solder removed and the halves heat treated. Tinweld was again used to join the halves. In operation, the die withstands the strain of clipping thousands of pieces of tungsten wire.

Tinweld can be used for all common metals except aluminum and magnesium and is particularly suitable for precision work.

(A-25)



Western Warehouse—Service Center,
Eutectic Welding Alloys Corporation
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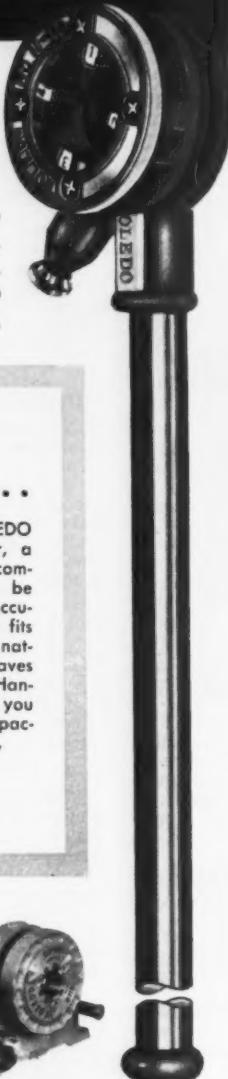
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30

WESTERN MEETINGS

... continued from page 26

box rim. The package is used during shipment of missile and test components and parts to a Florida test center and for interplant movement of these items. Advantages of this package are lower initial cost, easier and more economical storage when empty, space savings when full, less weight, and its capability of being palletized.

NEW AIE CHAPTER UNDER WAY IN PORTLAND got off to a big start with 20 interested engineers attending its first meeting and 35 at the second. Temporary president of the group until formal election of officers takes place is *A. R. Sadewic* of the Bingham-Willamette Divisions of



A. R. SADEWIC, temporary president of AIE's new Portland, Ore., chapter, is sparkplugging the formation of this group.

Portland, Guy F. Atkinson Co. subsidiaries. Other temporary officers elected at the group's second meeting are *A. M. Panter* of Montgomery Ward Co., vice president; *A. Dresden* of Bingham-Willamette, treasurer; and *W. Torkildsen* of Bingham-Willamette, secretary.

A series of meetings explaining the role of industrial engineering will be the first activity of this new group. Future meeting subjects will pertain to specialized areas of industrial engineering.

1957

WESTERN

MEETINGS

YOU

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PLAN

TO ATTEND

Jan. 21-22—TODAY'S TOOL FOR TOMORROW'S RESEARCH, symposium sponsored by Assoc. for Applied Solar Energy, Stanford Institute, Arizona State College, and University of Arizona, Hotel Westward Ho, Phoenix, Ariz. Contact John I. Yellott, secretary, Assoc. of Applied Solar Energy, 3424 N. Central Ave., Phoenix.

Jan. 21-22 — IMPLEMENTING LONG-RANGE COMPANY PLANNING, industrial economics conference sponsored by Stanford Research Institute, Fairmont Hotel, San Francisco. Contact R. W. Smith, conference chairman, SRI, Menlo Park, Calif.

Jan. 30-31 — NINTH ANNUAL COLLEGE-INDUSTRY CONFERENCE sponsored by Relations with Industry Division, American Society for Engineering Education, University of California, Los Angeles. Contact University of California Extension, Engineering, Los Angeles 24.

Feb. 7-8—GOVERNOR'S INDUSTRIAL SAFETY CONFERENCE, seventh annual California meeting, Biltmore Hotel, Los Angeles. Contact Michael Flagg, Department of Industrial Relations, Division of Industrial Safety, 965 Mission St., San Francisco 3, Calif.

... continued on page 32



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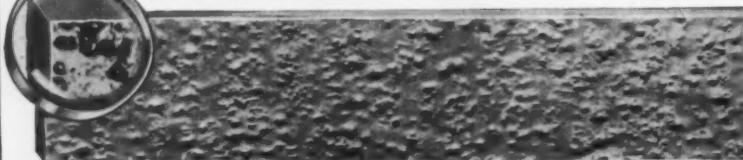
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WESTERN MEETINGS

... continued
from page 30

Feb. 17-20—CALIFORNIA TRUCKING ASSOC., state convention, San Francisco. Contact Wade Sherrard, managing director, 3301 So. Grand Ave., Los Angeles 7, Calif.

Feb. 18-21—WESTERN STATES MEAT PACKERS ASSOC., regional convention, San Francisco. Contact E. F. Forbes, president and general manager, 604 Mission St., San Francisco.

Feb. 26-28—1957 WESTERN JOINT COMPUTER CONFERENCE sponsored by the I.R.E., A.I.E.E., and the A.C.M., Statler Hotel, Los Angeles. Contact S. Dean Wanless, Public Relations Chairman, Aeronutronic Systems, Inc., 13729 Victory Blvd., Van Nuys, Calif.

Mar. 4-6—ASSOC. OF IRON & STEEL ENGINEERS, regional convention, San Francisco. Contact T. J. Ess, managing director, 1010 Empire Bldg., Pittsburgh 22, Pa.

Mar. 18-21—SOCIETY OF THE PLASTICS INDUSTRY, INC., annual national conference, Biltmore Hotel, and Pacific Coast plastics exposition, Shrine Exposition Hall, Los Angeles, Calif. Contact society headquarters, 250 Park Ave., New York 17, N. Y.

Mar. 25-29—AMERICAN SOCIETY FOR METALS, tenth Western Metal Exposition and Congress, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles. Contact W. H. Eisenman, managing director, 7301 Euclid Ave., Cleveland 3, Ohio.

April 24-26—NATIONAL ASSOC. OF INDUSTRIAL SUPERVISORS, 2nd regional convention, Ambassador Hotel, Los Angeles. Contact L. W. McKrill, executive secretary, 15032 Hilliard Rd., Cleveland (Lakewood), Ohio.

May 27-31—NATIONAL ASSOC. OF POWER ENGINEERS, national convention, San Francisco. Contact Mansfield W. Garratt, Sr., 140 Spear St., San Francisco, Calif.

June 9-13—AMERICAN SOCIETY OF MECHANICAL ENGINEERS, semiannual meeting, Sheraton Palace Hotel, San Francisco. Contact A. K. Ingraham, chairman, San Francisco section, 245 Market St., San Francisco.

June 11-13—THIRD WESTERN PLANT MAINTENANCE & ENGINEERING SHOW AND CONFERENCE, Civic Auditorium, San Francisco. Contact Clapp & Poliak, Inc., Monadnock Building, San Francisco.

June 18-20—TRIPLE INDUSTRY SUPPLY ASSOC., national meeting, San Francisco. Contact Robert C. Fernley, secretary, National Industrial Distributors Assoc., 1900 Arch St., Philadelphia 5, Pa.

Aug. 18-25—WESTERN ELECTRONIC SHOW & CONVENTION, San Francisco. Contact Mal Mobley, Jr., business manager, 344 N. La Brea, Los Angeles 36, Calif.

Aug. 28-30—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, Pacific general meeting, Yakima, Wash.

Sept. 10-12—AMERICAN MINING CONGRESS, metal mining and industrial minerals convention, Hotels Utah and Newhouse, Salt Lake City, Utah.

HYSTER INDUSTRIAL TRUCKS ARE BUILT TO DO THE HEAVY WORK



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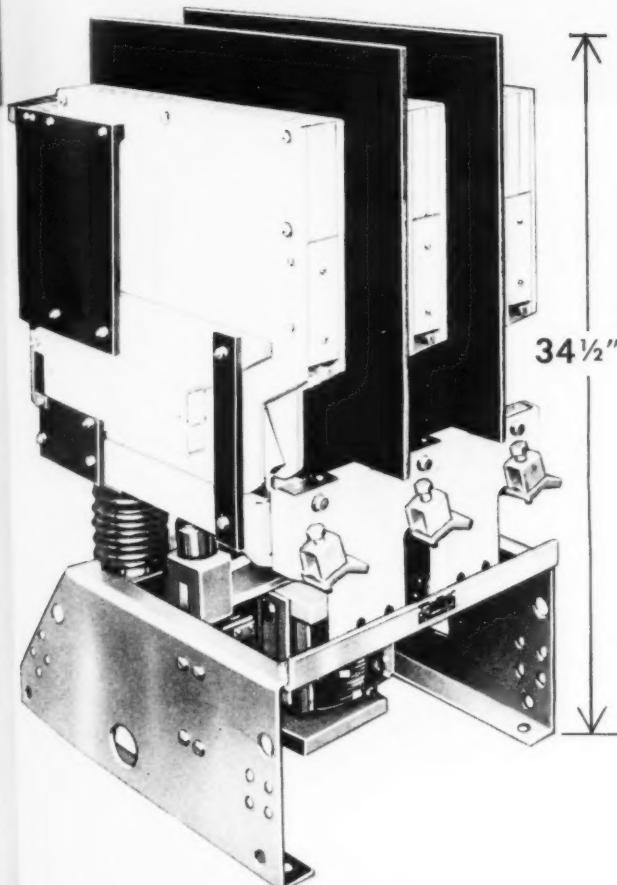
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NEW Development

in High Voltage

Air Break Contactors



Here's a brand new high voltage contactor . . . incorporating the same design simplicity on which the "Quality" reputation of Allen-Bradley motor control is based. Like the Allen-Bradley control having a rating of 600 volts a-c maximum, the new 5000 volt air break switch is of the solenoid type, has only one moving part, and thus is assured a mechanical life of millions of operations. The silver alloy contacts are also double break, and remain in perfect operating condition irrespective of the frequency of operation, or whether used in reversing or jogging service. Available for 2500 and 5000 volts. Interrupting capacity 50,000 kva.

NOTE THESE FEATURES—

ONLY ONE MOVING PART—Simple solenoid design eliminates all pins, pivots, and flexible "jumpers."

COMPACT—Unique design and development in new materials made possible a switch of unusually small size.

DOUBLE BREAK, SILVER ALLOY CONTACTS—Require no maintenance. There are no flexible jumpers. Straight up-and-down motion assures good uniform contact pressures.

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high voltage starters
(UP TO 5000 VOLTS)**

**as up to date
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Allen-Bradley Air Break Contactor!

Using the new air break high voltage contactor as the "base," Allen-Bradley has available a complete line of full voltage and reduced voltage starters for all types of motors up to 5000 volts.

For standard squirrel cage and synchronous motors, the full voltage starters can be furnished for either non-reversing or reversing service. In the reduced voltage construction, both squirrel cage and synchronous starters are of the reactor type. These starters can also be supplied for reversing service. In addition, the Allen-Bradley high voltage starters can be built for use with part winding and slip ring motors.

All Allen-Bradley high voltage starters are equipped with current limiting fuses and a front operated disconnect switch which is interlocked with not only the doors of the enclosure but also the high voltage contactor. All starters have an interrupting capacity of 150,000 kva at 2300 volts and 250,000 kva at 4600 volts.

Overload relays with current transformers provide continuously reliable motor overload protection. The maximum rating of this new line of starters is 1500 hp, 2300 volts; 2500 hp, 4600 volts. These ratings for synchronous motors are at 0.8 P.F.

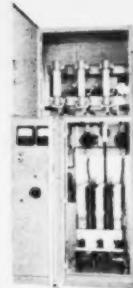
Because of the simplicity of design of the Allen-Bradley high voltage contactors, having only one moving part, and also using double break, silver alloy contacts which are always in perfect condition, these starters are recommended for applications requiring frequent operations. These are truly "heavy-duty" starters.

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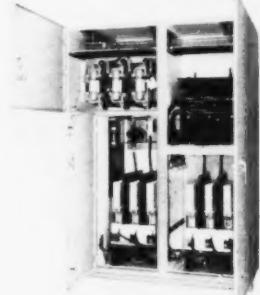
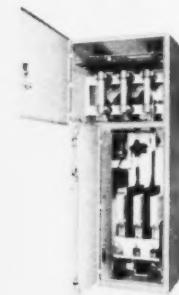
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Quality

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Bulletin 966 high voltage air break across-the-line type synchronous starter. Picture at left shows unit with doors to high voltage fuse and high voltage contactor compartments open.



Bulletin 1159 across-the-line starter for high voltage squirrel cage motors.

Starters are shown with doors to fuse and high voltage contactor compartments open. Note the bus bars at the top of the cabinet and the plate on the side of the cabinet for connection with similar buses in adjacent starters. This is an optional feature.

**Write for
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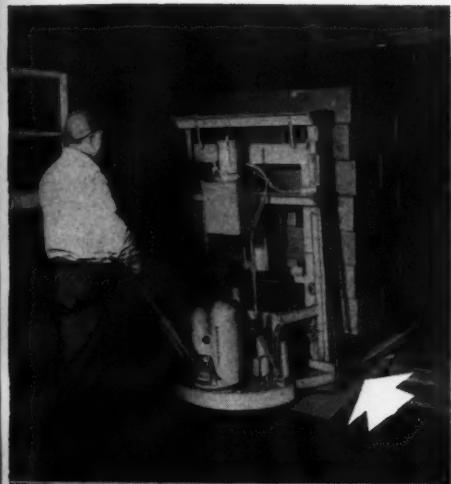
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NEW JACK KNIFE FEATURE by MOTO-TRUC

**Licks Low Underclearance Problem
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STUCK on the crown of a ramp

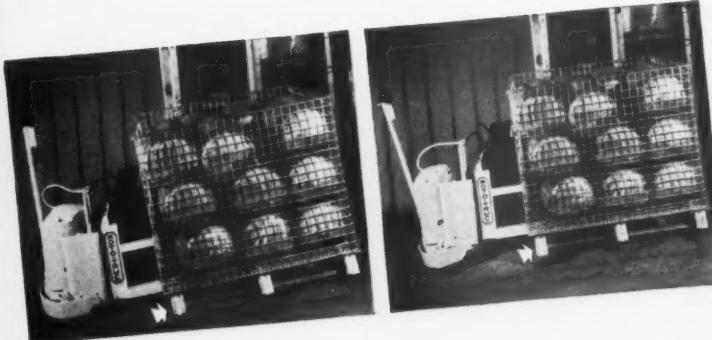


JACK-KNIFE Action lifts you clear

Because of low underclearance, pallet and outrigger trucks sometimes get stuck on the crown of ramps, dock boards, or sills. If you're faced with that problem in your plant or on your loading dock, Moto-Truc's Jack-Knife Action is the answer . . . it makes your Moto-Truc "Walkies" more useful than ever!

A simple, pushbutton controlled, hydraulic adjustment of the hinged frame gives you that extra clearance needed to take the truck over the crown of a ramp without hanging-up.

You can have this inexpensive feature included on your next Moto-Truc pallet or Hi Lift Stacker at only a slight additional charge. Increase the operational range of your trucks without sacrifice in capacity or load handling ability.



Ask for Jack-Knife Action on your Moto-Truc pallet models, too! Get that extra lift that lets pallet and truck clear the crown of ramps. Let this low cost feature solve your under clearance problems.

Write for Complete Details:

Call your local Moto-Truc representative or write for complete details and prices on Moto-Trucks with Jack-Knife Action!

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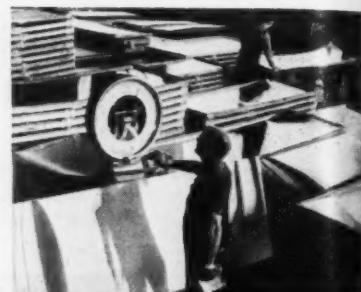
BUYERS GUIDE TO STAINLESS

A Directory of Ryerson Stainless Steels and Services

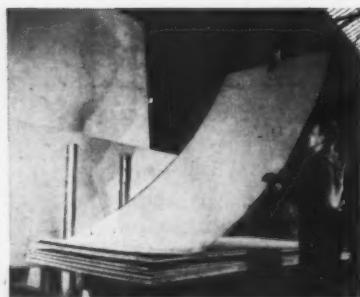
Here's a quick guide to the nation's largest stocks of stainless steel—2,351 sizes, shapes, types and finishes of Allegheny stainless in stock at Ryerson.

This wide selection assures you of getting the best stainless for every application. Extra care in storage, handling and shipping—such as padded shear clamps to protect finish and flatness of sheets—guards the high quality of Ryerson stainless stocks. And in addition, the help of full-time stainless specialists is yours when you call Ryerson.

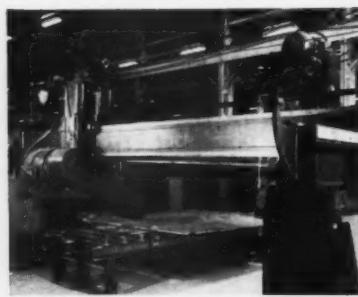
See your Ryerson catalog for a complete listing of stocks and call your nearby Ryerson plant for quick shipment of Allegheny stainless—one piece or a truckload.



SHEETS—11 analyses of Allegheny stainless sheets in stock including nickel and straight chrome types. Also extra wide sheets to reduce welding costs.



PLATES—Available in 9 analyses including plates to Atomic Energy Commission requirements and to ASTM specifications for code work. Also extra low carbon types for trouble-free welding.



TRUE-SQUARE DISC CUTTING—Stainless plates up to 12' x 25' cut absolutely square on abrasive disc machine. Length and width tolerance plus or minus 1/32".



A NEW STEEL—Type 202 Allegheny Stainless is available in 14 to 26 gauge sheets. Type 202 compares favorably with 302 in corrosion resistance; costs 2 1/4¢ per lb. less.



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WESTERN INDUSTRY — December 1956



leaving reservation . . . Indians . . . move to city . . . work in plants



December 1956



earn jobs . . . earn daily bread . . . happy, peaceful . . . prosper . . . help boost production

Indians on your production line?

EVER think of American Indians as a solution to your manpower shortage? Wondered how they would work out in your plant? What are their aptitudes and shortcomings? Are they problem-employees? How do you go about tapping this manpower supply? Does it cost you anything—in cash OR in special consideration?

To get for its readers the answers to these and similar questions, the editors of WESTERN INDUSTRY have conducted an extensive six-month survey of Western plants that have already hired American Indians who, under a well-directed program, are moving from their reservation homes and becoming a part of what we consider "everyday life."

Results of that survey should serve to dispel any theories that American Indians are migrating problem-employees for the many plants who have hired them as production and maintenance workers. To the contrary, the

study of Western plant employment of Indians has revealed a broad base of "same-as-any-other-worker" reports peppered with "learn-faster," "higher-interest-in-job," and "less absenteeism" comments. The "fired-due-to-drunkiness" or "couldn't-learn-the-job" reports were practically nil.

Number of Indians employed by plants studied ranged from one to thirty. But in almost every case, Indians hired by the plants were not observed any more closely than any other new employees. No special rec-

ords have been kept on their abilities or habits. Fellow-workers accept them willingly and, as is typified by a comment from the Robinson Brick & Tile Co. in Denver, Colo., "One is an extremely happy cooperative individual who is extremely well liked by everybody he works with," they get along well with their co-workers.

On the other hand, a quote not at all typical of the reports received reads, "We have employed three or four American Indians. However, generally speaking, we have not had the best of luck with them. Perhaps part of our problem has been because of their youth. In any event, on numerous occasions we found indications of excessive drinking, which, in at least one case, resulted in the employee's discharge." The plant went on to state that ". . . certainly do not mean that we would not consider employment of American Indians However, I do believe our company and the respective government agencies are going to have to work more closely in a counseling program,

INDIAN-STYLE MESSAGES—
like the one above, were once familiar Western sights. We asked Peter P. Three Stars, Indian placement officer at the San Francisco branch of the Bureau of Indian Affairs, to provide this appropriate "picto-graph" summation of the relocation program.



Left:
H. A. Mathiesen
San Francisco



Left:
S. D. Lyman
Denver



Right:
M. N. Gamble
Los Angeles



Right:
P. F. Walz
Formerly, San
Francisco—now
in Wash., D. C.

The relocation program, and the Westerners behind it

The Bureau of Indian Affairs estimates that less than three fifths of the American Indians now living on government reservations could be supported on a decent standard of living from resources available, and they *would* be supported in such a fashion if there were only three fifths as many living on the reservations.

However, several factors have influenced most of the 300,000 Indians (there are only about 400,000 in the entire country) living on reservations to stay there, even in destitution, rather than move to non-Indian communities. A desire to live in a familiar culture, an inherent distrust of the white man and his motives, personal feelings of inferiority and lack of self confidence, and a lack of vocational skills with which to earn a living away from a reservation all play a part in the Indian's reluctance.

This has changed notably in recent years. Self confidence and a healthy curiosity have come to these people. This can be accredited to years of education and an opportunity afforded by World War II during which many Indians entered the Armed Forces or went to work in defense plants.

In recognition of the Indians' new desires and to ease conditions on reservations the Bureau of Indian Affairs has established a voluntary relocation program. The program offers Indians on reservations realistic counseling and guidance regarding living conditions to be expected away from the reservation and information about housing and permanent employment opportunities. Limited financial help is also provided under the program.

This is not a big operation. It does not pretend to meet the entire need in the field of Indian affairs, but it *has* demonstrated that many Indians can adjust successfully to non-Indian communities. Some relocatees have gone to smaller cities in the midwest and Western states. Many have relocated to areas where there are Field Relocation Offices to help them find work and get settled.

At the present time there are six of these offices, four of which are in the West. They are located in San Francisco, San Jose, and Los Angeles, Calif., Denver, Colo., St. Louis, Mo., and Chicago, Ill. During the fiscal year 1954, 2,047 people were helped to leave reservations and get established in these centers. Fiscal year 1955 saw another 3,141 relocatees settled and, during the first half of 1956, 2,260 Indians were helped.

These people come from reservation areas in North Dakota, Montana, Wisconsin, Minnesota, Arizona, New Mexico, South Dakota and Oklahoma. Tribes represented include Sioux, Navajo, Chippewa, Cherokee, Choctaw, Assiniboine, Gros Ventre, Pima, Papago, and Apache.

Securing employment is only part, and not always the most difficult part of the relocation process. Complete success involves assistance in securing housing, obtaining and providing information on local community resources, liaison service between newcomers and appropriate social agencies, etc. In doing all of this, the Bureau seeks to obtain maximum assistance from local community welfare agencies, churches and civic organizations.

especially with younger Indians who have just left the reservations."

A large majority of the reporting plants mentioned the high quality of assistance provided them by local offices of the Bureau of Indian Affairs. It is through this organization's field relocation service that Indians are placed. A few plants in the Denver, Colo., area reportedly make a practice of calling upon the local field relocation office every time they have an employment vacancy. Others accept applications on a competitive basis and often hire Indians, because, in individual cases, they may be better adapted to the type of work.

However, Indian employees do not seem to be particularly suited to any one type of work—with the exception

of jobs generally requiring a high degree of dexterity. Believing the Indians to be of equal quality in competence and ability, one plant reports that it "...uses Indian people because of a confidence in the Bureau of Indian Affairs field relocation service to refer to us workers on whom they had gathered more background information than normally obtained from our own checking processes."

Jobs Indians are performing in Western plants vary widely. They are found working as machine operators, lift truck operators, lead men in tooling work, cleaning department workers removing surplus metal from castings, maintenance mechanic helpers, laborers, electric furnace production workers, ingot preparation men,

assemblers, materials handling and warehousing workers, foundry workers, craters, structural steel fabricating shop workers, reinforcing steel plant workers, electrical wiring and soldering men, crane operators, mechanics, press operators and spot welders.

Typical of the lack of racial or class discrimination displayed in Western plants is a report from Westinghouse Electric's Sunnyvale, Calif., plant, the working place of several American Indians. "Westinghouse employs many people from the so-called 'minority groups,' but once they are employed, no record is kept of them as such. They are placed, trained, and advanced just like any other employee. There is no discrimination and no favoritism. Since we deliberately



SHEET METAL FABRICATION AND CARPENTRY were studied by Otis Kel Brown at the Sherman Institute, Riverside, Calif. Skills gained make him an efficient worker in Norris-Thermador's Los Angeles, Calif., plant.

avoid identifying individuals with the specific groups, we feel that it is not a good policy to single out for special mention any who have done particularly well."

A good indication of how this type of thinking, so typically Western, pays off because plant supervisors do not start looking out for problems with certain workers. is this report from San Jose Steel Co., in San Jose, Calif. "When we employed the American Indians we did not anticipate any difficulties or any problems because of this employment. We did not experience any problems, and we are not surprised."

And some of the Indian workers in Western plants show plenty of talent and a willingness to work that makes them eligible for advancement. For example, the Robinson Brick & Tile Co., in Denver, Colo., employed Richard Fillmore as a worker in its Vitrineer department. He showed a willingness to take time to learn the job and a high degree of cooperation. While learning the job, he demonstrated his ability to get along with other people and to direct the work of others. Consequently, he has been promoted to lead-man in the department, and, if he continues to progress, will ultimately become a foreman.

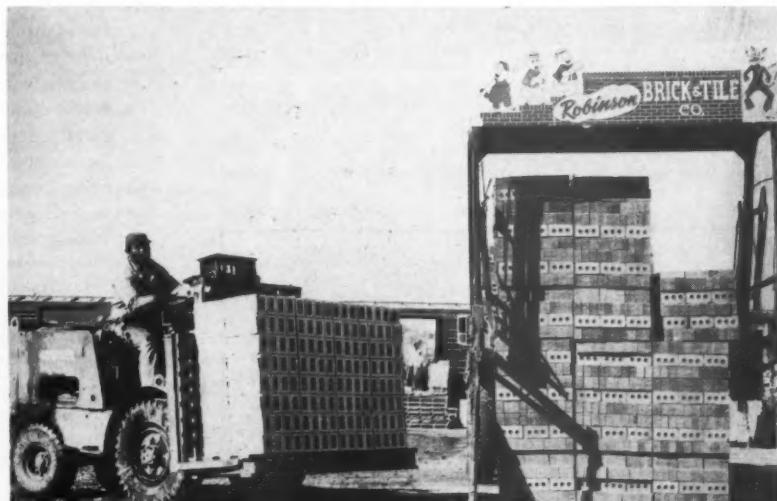
Generally, the Indians adjust to the change in mode of living very well. Certainly the survey revealed that they do well as the average family newly moved into a community. For instance, one Indian moved to Colorado in August of 1955. His family

consisted of a wife and four children. They had no car and were moved with their few possessions in a government car to a Colorado city. Since company housing was unavailable for new employees with families at the town in which he was to work, they lived in a tourist cabin in a small town 12 mi. away until the Bureau of Indian Affairs was able to obtain a rented house for them. The Indian joined a car pool for transportation to and from work.

Today, the family has a 1955 Chevrolet, their second car during the year, and a new child. The man is highly regarded by his company and

is a substitute foreman. He has developed enough seniority to have next bid on choice of jobs.

One report brings out a value that is probably inherent to many situations where more than one Indian is employed in the same department of a Western plant—teamwork. Working as ingot preparation men at Western Rolling Mills, Inc., in San Jose, Calif., are Glen Avery and John Begay. They learned their work as "fast or faster" than other employees with the same education, but real value received stems from the speed and efficiency with which they work as a team.



A REAL CHALLENGE was handed Clinton Hogan when Robinson Brick and Tile Co. hired him in Denver, Colo., to learn the complexities of lift truck operation, but a willingness to cooperate has made him highly skilled.

How industrial engineering consultants can help you

The rapid birthrate and growth of Western plants, large and small, is placing unusual pressures on their plant operating executives. The current need for the application of industrial engineering techniques and utilization of trained personnel in this field, especially in small plants, was outlined in a series of articles in 1955, the thesis being that even the smallest Western plants actually can afford the "luxury" of setting up and maintaining their own industrial engineering departments. Presented below is a thoughtful discussion on another facet—how the special services of Western industrial consulting engineers can meet the needs of Western plant managements today. We believe it is worth your thoughtful attention (see editorial on page 13).—Ed.

THE TREMENDOUS EXPANSION of industry in the West, and the predominance of newly-formed and rapidly growing firms here, has placed many new and complex problems on the shoulders of the typical Western plant operating executive. This in turn has created special needs in the West for the utilization of men trained in the many-faceted and comparatively new field of industrial engineering.*

In previous issues of *WESTERN INDUSTRY* (July and September 1955), Professor DeGarmo of the University of California stirred considerable interest in Western plants with his discussion of the need for industrial engineering in typically new and expanding firms. And Professor DeGarmo clearly pointed out that an industrial engineer on a full-time employment basis will pay for his services in firms employing as few as ten people.

There is no doubt that industry today has generally acknowledged the benefits of industrial engineering to manufacturing operations. Nevertheless, many Western firms have not as yet adopted industrial engineering practices or actual departments within their organizations. Primarily, this is because they have never had experience or contact with the field of industrial engineering. Lacking this experience, they are seemingly unaware of the qualifications that an industrial engineer should have and are therefore reluctant to hire such technical services. Furthermore, this lack of experience makes it difficult for these firms to organize and guide the work of an industrial engineer once he is hired.

The industrial engineering consultant profession is performing two primary functions for industry. The first of these functions is to select and train personnel to be used by a given company in its industrial engineering depart-

ment. At the same time, help is provided in getting such a department started by establishing sound industrial engineering principles, practices and procedures. Thus, the new industrial engineering department of the company has its greatest chance of succeeding and produces the greatest benefit to the company.

The second major service is in performing industrial engineering services for plants both large and small. More and more firms are finding that, by retaining the services of an experienced qualified industrial engineering consultant, certain specific projects can be carried out with excellent results and a minimum of time and expense.

What services do they offer?

Production plans must be well coordinated and the operations controlled in order to yield the greatest possible return on investments in men, machines and materials. Industrial engineering consultants help progressive plant management accomplish this by offering direct services in all phases of industrial engineering, such as the following:

1. Revision of plant layouts for better operation and developing of plant layouts for new factory buildings.
2. Developing of materials handling systems and improvement of present methods.
3. Installation of inventory control system.
4. Job evaluation programs.
5. Development of wage incentive systems.
6. Development of production standards.
7. Programs to coordinate production planning, scheduling and dispatching.
8. Improving methods of operation.
9. Motion and time study projects.
10. Development of quality control procedures.
11. Inventory controls.
12. Work simplification programming.
13. Coordinating cost reduction programs.

The above is only a partial list of some of the specific projects that are carried out by industrial engineering consultants. To this list we can add many other projects such as the development and guidance of a new industrial en-

AUTHOR OF THIS ARTICLE



... Stanley G. McIntyre, San Francisco industrial engineering consultant, prepared this article at the special request of *WI* editors. Fifteen years of industrial engineering experience, most of which has been in the West, lie behind the pointers given. He has been a consultant in the field during the past four years.

* To clarify the scope of "industrial engineering," here is a concise definition provided by the American Institute of Industrial Engineers: "Industrial Engineering is concerned with the design, improvement, and installation of integrated systems of men, materials, and equipment. It draws upon specialized knowledge and skills in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems."

gineering department for a company. Also, many projects are carried out on a retainer basis which provides for a periodic checking on the efficient operation and possible improvements from time-to-time of various manufacturing operations.

Why should you use a consultant?

The industrial engineering consultant can render a valuable and often indispensable service. He can concentrate on one problem at a time. He can apply a varied experience gained over the years in a service of many different enterprises to the benefit of his immediate client, after learning of his client's specific needs and condition. He can bring to bear on the assigned problem a fresh, unbiased, impersonal and professional point of view. A busy plant manager facing a difficult or a new problem, or forced to deal with too many problems at one time, can delegate one or more of them to a retained consultant. Given such tasks, the consultant can devote himself exclusively and wholeheartedly without distraction, interruptions, or bias, for he is free from the insistent and demanding duties of keeping up with existing procedures. Through the consultant or through his advice and aid, the plant operating executive can push forward a better permanent program at times when the executive cannot give his undivided time to it. Thus, he uses the consultant to augment his own organization. In other situations an independent consulting firm can provide independent counsel and specialized aid that a plant's own permanent staff, however efficient in its regular work, is unable to offer.

Economy is served by retaining independent industrial engineering consultants to supply infrequent needs such as plant layout for a new building, since the consultant's services can be terminated freely when no longer required.

Many case studies have shown that plants can use industrial engineering consultants to extremely good advantage, especially under one of the six following conditions.

1. A lack of time or staff or both to do the job.
2. A lack of previous success in solving the specific problem at hand.
3. Previous employment of a consultant for political or organizational reasons under certain conditions.
4. A strong desire for a fresh look at the company or at a specific problem.
5. In a plant confronted by a problem with which it was not familiar.
6. A need for special information not normally available.

How to pick the right one

Obviously the success of any industrial engineering consultant project depends largely upon the ability of the company to choose the right industrial engineering consultant. However, success also hinges on the ability of the consultant to determine if he is competent to handle the specific project at hand. The prospective user of a consultant should use the following criteria in selecting a consultant for a specific job:

1. What is the consultant's reputation?

2. Is the consultant's staff capable of handling your specific problem or task?

3. Can you secure a reasonable estimate of the cost of the work to be done?

4. Is the consultant's credit rating sound?

5. Do you like the manner in which the consultant went about securing your business?

6. Is the consultant going to keep an eye on the ball?

7. If the problem requires specialized knowledge of the industry or of the project, does the consultant have such a knowledge?

Obviously, if the manager of the company chooses a consultant on a basis of a fancy sales talk, or of the promise of a terrific bargain, he is apt to be highly disappointed. Consulting service does not come cheap, and should not. High caliber personnel are required and they must be held against the competition of high paid jobs in industry. In fact, the senior members of some of the consulting firms are greater specialists in their particular field than a comparable man in industry. They have to be in order to meet the demands that are put to them by the specialized problems that they are called on to solve.

In checking on the reputation of the consultant, the manager of industry has many reliable avenues on which to base his decisions. His business friends and managers of other industries or other companies are in position to recommend either favorably or unfavorably a given consultant. Other sources would be consultants; any reliable consultant firm would be only too happy to discuss with you your selection of an individual consultant for a specific job. Among other sources are the present and past clients of the individual consulting firm, banks, credit agencies, your advertising agencies, your CPA firm or your attorney.

Whatever the source of reference, some degree of checking should be done by the company to make sure that the proper selection is made. Likewise, you will find that reliable firms who are in this field will check your project very carefully, usually at no cost to you and, if they feel the project will not be successful, they will inform you of their decision and refuse to accept the project.

It is not sufficient to check only the reputation of the individual firm. A prospective user of an industrial engineering consultant must also check to see who is actually going to perform the job. Some firms may have very capable men who have done similar jobs for other clients with very good success, but oftentimes those men may not be sent to your particular company. Thus, you should check to see who will do the job for you. Find out if he is technically competent. Will he work with your organization? Can he gain the respect and cooperation of your people? Will he work with your organization rather than putting your people to work? And, is he your kind of man?

Prerequisites to successful relations

In addition to selecting the proper consultant for a specific assignment, you as well as the consultant must be cognizant of certain prerequisites which, over a period of years, have been found essential in producing maximum benefits in any consulting assignment. The following four prerequisites are essential:

1. Before the consultant is employed, there should be sufficient pre-planning by the employer to understand that there is a definite need for a consultant. This pre-planning is of absolute necessity to insure a successful project.

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2. Before the consultant's assignment begins, there should be a clear understanding by both parties as to the nature and scope of the problem. The problem must be defined, the estimate of cost to the company and the rough time table of performance must be agreed upon, and a statement of possible benefits to the company must be forthcoming from the consultant. There must, at this point, be a complete meeting of the minds between the consultant and the officials of the company that a problem exists and that the consultant can be of help to them in solving the specific problem.

3. The consultant must have a thorough briefing of the problem and of the company's organization policies, and practices to carry out his project successfully.

4. Some executive, or group of executives, should have the clear responsibility for working with the consultant. The consultant should report to and work with a specific individual or group within plant management. It is preferable to have him work with one member of the plant operating staff unless a group responsibility can be established which will not allow buck passing. It is rather discouraging to the consultant if he has been retained by the president of the company and the president of the company is away on a three-month business trip. If the consultant has no one to work with within the company, the consultant's work is not apt to be carried out to best advantage of the company. At the same time, if possible, the consultant should be furnished with sufficient company staff to help him in performing his task. At the same time the company staff would be trained by the consultant as he performs his job so that the recommendations he comes up with will be carried out later by the company's own staff. At the completion of the project, the consultant's recommendations must be offered and received with the realization of known or assumed limitations and whenever possible, the recommendations must be properly implemented in one way or another.

The following is a check list for judging industrial engineering consultant benefits to the company.

1. After a reasonable period of time, are the consultant's recommendations still in effect and useful?
2. Is the consultant willing and able to implement his recommendations?
3. Was the assignment carried on with a minimum of disruption in the organization?
4. Did members of the organization learn and grow through their contact with the consultant?
5. Did the company receive new ideas from the contract?
6. Does the organization have confidence in the technical competence of the consultant?
7. Is the organization willing to live with the consultant's recommendations?
8. Was the job done within the original time and cost estimates?

What is their "code of ethics"?

Unfortunately there is not as yet any form of accredited registration for industrial engineering consultants as in the case of doctors, lawyers, civil engineers and other professional people. The industrial engineering consultant, regardless of the size or type of the job in which he is engaged, should be willing and able to conform to the

following ethical tenets in his dealings with his clients:

1. An honest presentation of his skills, experience and the staff to be assigned to your problem in advance of undertaking an assignment.
2. A willingness to decline a job for which he is not fitted or to discontinue a job in which he discovers he is not helping the company.
3. Complete protection of the company's confidential information.
4. Complete adoption of the company's best interest.
5. Sympathy for, ability in, and understanding of the human relations surrounding his work in the company's organization.
6. A reasonable estimate of the total cost of the job under consideration, prior to beginning the work.
7. On request of the company, a statement of his understanding of the problem.

How much will it cost you?

As was stated above, industrial engineering consultants' service cannot be a low-cost matter. Consultants for the most part represent high caliber personnel with professional standing. Most of the men in the field have had a great many years experience in the field of industrial engineering and are highly competent. Many executives find it difficult to understand why the fees of a consultant are two or three times as high as the salary paid an employee of comparable background and experience. It is to be acknowledged that the consultant, or the consulting firm, has certain overhead expenses which must be met that are above the salary paid to the individual consultant.

Overhead expenses, which include all fringe benefits normally paid by the employer, all office expenses including typing and duplication, taxes, insurance, etc., are usually as high as the salary of an individual consultant. Furthermore, the cost of salary and overhead continue to the consultant between assignments at no cost to the client.

These are usually estimated in the form of minimum-maximum range for the specific assignment plus traveling and other out-of-pocket expenses. Lump sum arrangements are rare for it is almost impossible to tell in advance just what problems will turn up and how much work will be required to do an adequate job. Estimates are most often figured on a per-day base rate for the staff member's time. The per diem fee most commonly used ranges from \$50 to \$150 per day per man. Occasionally this is higher depending on the experience and reputation of the individual in the firm of which he is a member. Other arrangements, such as retainers, will often vary from \$75 to \$250 per month to give a company constant counsel in the field of industrial engineering.

Rigid contracts are rare, but a complete understanding should be made between the company and the consultant as to the fees and schedules to be performed. The usual manner in which this is accomplished is by exchange of letters between the consultant and the company officials.

In the final analysis the burden of the cost will be negligible if the desired results are achieved. Not only does the use of the consulting service enable the client company to avoid adding permanently to its staff for temporary needs, but the job gets done quicker and the benefits are realized sooner.



PLACED ON A BED OF POPCORN, one of Ampex's tiny electric motors is in the midst of packaging. Then carton is filled to overflowing from hopper . . .



AND A STEEL TAMPING PLATE mounted on a fulcrum for leverage is used to pack the popcorn tightly around the motor. Next, the carton is sealed . . .

Looks like popcorn wadding (it is!)

POPCORN—minus butter and salt—is practically eliminating shipping damage of the 85 different types of electric motors packaged by Ampex Corp. in Redwood City. About a 99% improvement is reported. Utilized as a packaging medium, the common popcorn has also made it possible for Ampex to use only one type of container for shipping the motors, whereas about 35 to 40 different packages would be needed if conventional packaging methods were used. Cost of equipment: \$100.00. Cost of popcorn: less than \$.20 per package.

The unique packaging method was worked out by Grover Hoskins, Ampex's packaging engineer. Shipping damage had been exceedingly high. It doesn't take much of a jolt to knock out a shaft that has been aligned to a tolerance of one-half ten thousandth of an inch. Several types of wadding had been tested, including sawdust and foam rubber, but each had a tendency to shift and pack.

Manufacturers of tape recorders and related equipment, Ampex produces a wide variety of motors as spare parts. Several sizes of boxes were needed to accommodate the different types, some of which had fly-wheels, some fans and others double shafts.

During the first few months of using

popcorn as a packing, damage claims dipped to only four in 1,000 shipments. One of the four had been run over by a truck's wheels; the others met similar fates. A series of rigorous tests were imposed upon the new packaging medium. Sealed in a polyethylene envelope, packed in popcorn and protected by a corrugated box, test units were dropped on all eight corners from a height of four feet, rolled down a long flight of stairs and kicked generally for good measure. Checked on a surface plate, the motor and shaft still retained original fine tolerance.

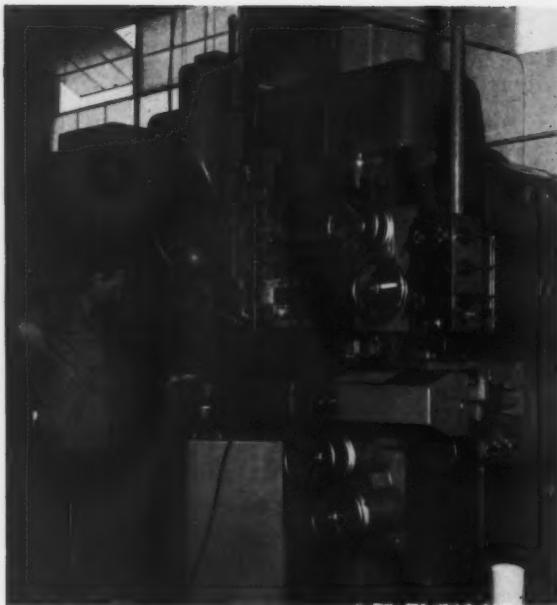
Here's how the packaging operation works. Cardboard containers—a standard 10 x 10 x 12-in. size—are placed beneath a hopper and half-filled with popcorn. Then the motors are bedded in the wadding and the boxes are filled to overflowing. The material is tamped down flush with the top of the boxes by a rectangle steel plate the same size as the box and mounted on a fulcrum. This tamping device was developed especially for this operation. Finally, the box is sealed with tape.

Popcorn is purchased already popped from a local theatre supplier. Only a few cases are purchased at a time. Thus, the material does not have much time to absorb moisture and lose its resiliency.

and
kicked
down
stairs . . .



NOT ALL, BUT A TEST UNIT was given this severe punishment to gauge the effectiveness of the new packaging medium. Shaft tolerances on the test motor checked out down to half a ten-thousandth.



SUB-FLOOR REINFORCEMENTS had to be poured to accommodate huge machine tools like this Bullard Cut Master when AiResearch decided to revamp an office building to house its Industrial Division in Los Angeles.



OVERHEAD CONVEYORS had to be supported on special steel arches set into the building's floor because the existing roof structure was too weak to support the weights to be carried during daily operations.

Office building turned plant

Weak roof, weak floor, wrong partitions . . . it took top-notch plant engineering skill to beat these conditions for AiResearch in Los Angeles.

HOW do you go about turning an old plant into a fully-up-to-date production unit when the floor and roof are both too weak and the partitions are of the wrong type? The Garrett Corp.'s AiResearch Industrial Division faced this question and many others when it decided to convert an office building into a factory to house its mass production turbocharger plant in Los Angeles. And the problems solved in this case are common to many similar Western plant expansion situations.

The building chosen to house the new plant had originally been erected and used as an office building. Its only outstanding features, other than the fact that it was the most economical choice of locations, were its roominess (63,900 sq. ft.) and good lighting.

On the other side of the ledger were: a slab floor too weak to support heavy machinery, a roof structure lacking strength to support necessary overhead conveyor systems, and partitions that had been installed to provide noise and personal segregation of people—not machines. The econ-

omy-glued eye of AiResearch Industrial Division's operating staff soon cast aside such obvious solutions to the problems as construction of a new roof and a new floor.

Working in conjunction with the J. B. Seage Co., Los Angeles industrial engineering firm, a miniature layout of the factory floor as it would finally appear was made. Miniature models of each machine that would eventually operate on the production lines were made and pushed around the model layout until, out of innu-

merable combinations, a choice had been made as to the most effective equipment arrangement plan.

Once the most effective arrangement had been determined, it was a simple and much less costly matter to reinforce the floor slab with a sub-foundation under the location to be occupied by each heavy machine.

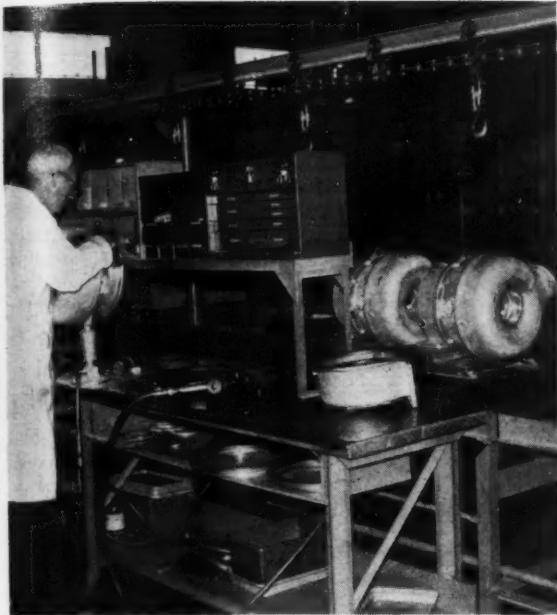
In lieu of a costly new roof, the problem of the building's low-strength roof structure was solved by a simple installation of floor-mounted steel uprights for support of all overhead conveyor equipment.

During the pre-planning stages of the plant revamping, several important considerations were foremost in the minds of the plant's operators. A straight-line material flow through the plant was desired to minimize materials handling activity and costs. Exact power, water and compressed air requirements for each of the various shop divisions had to be established so that efficient plumbing, wiring and piping could be planned. Every installation, plant conversion, and service facility had to be held strictly within

AUTHOR OF THIS ARTICLE



**G. S.
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Corp., and Mgr.,
AiResearch In-
dustrial Div.
Los Angeles, Calif.



BETWEEN-PROCESS HANDLING IS MINIMIZED by these assembly line roller conveyors installed at easy-to-reach work bench height.

the existing municipal building codes. However, the pre-planning paid off as was evidenced when the plant was ready for occupancy just three months after the conversion work was started.

Next came the problem of planning the most effective tooling for the plant to enable mass production of precision turbocharger parts. In the planning and scheming devoted to the mass production system, AiResearch plant operators hit upon the solution to many production problems that are common to other plants' operations. Here's a run-down of the end results of this tooling effort and a brief, step-by-step description of the mass production facility from forging to finished precision turbine.

The products involved

Garrett's AiResearch Industrial Division is currently producing two turbocharger models—the T15 and the T30. The T15 operates at rotational speeds up to 48,000 rpm.; the T30 to 40,000 rpm. The turbochargers derive their motive power from exhaust gases of the diesel engine on which they are installed. This power is used to compress air fed into the engine's fuel system. Field tests show that diesel engine power is boosted as much as 50% by turbocharger installation.

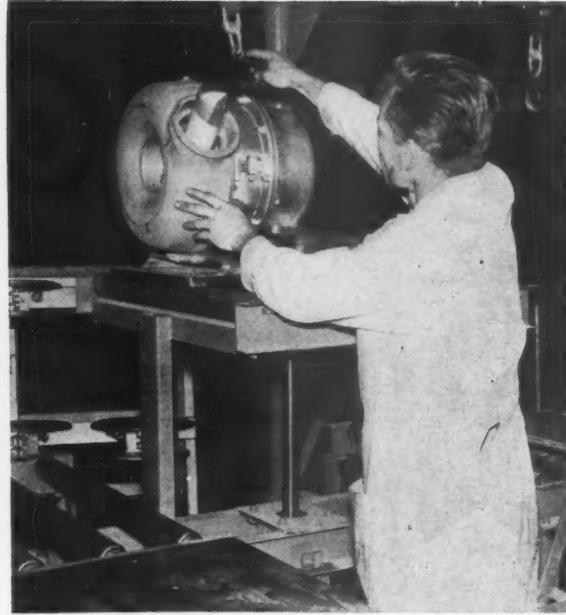
Meehanite and aluminum castings and forgings represent the major components of each turbocharger. These castings and forgings are produced by sub-contractors to AiResearch speci-

fications. Every casting and forging that enters the AiResearch shop requires more or less critical machining. This makes the machine shop the plant's most important production facility.

Machine tool arrangement counts

Shop machines are arranged in groups according to the turbocharger parts they produce. Within each group, each machine is placed so that work progresses normally from one machine to the next. Parts start along the machine shop line on palletized trucks, each containing a specified number of parts. This makes it easy to check production and especially to check for lost or mislaid parts. A blank space on the pallet is immediately indicative that a part is missing. To conserve floor space, pallets on the trucks are so constructed that they can be piled three high if necessary, a very important feature when an in-process work tie-up occurs. Work piles upward, not outward, to interfere in adjacent areas. Midway along the shop line, some of the parts are removed from the pallets and continue on roller conveyors that pass from machine to machine as the work progresses.

As precision production is required all along the line, precision machines are not spotlighted in the plant. Though they are extremely versatile in concept, many of them are specially tooled and used for a limited number of production operations. This makes



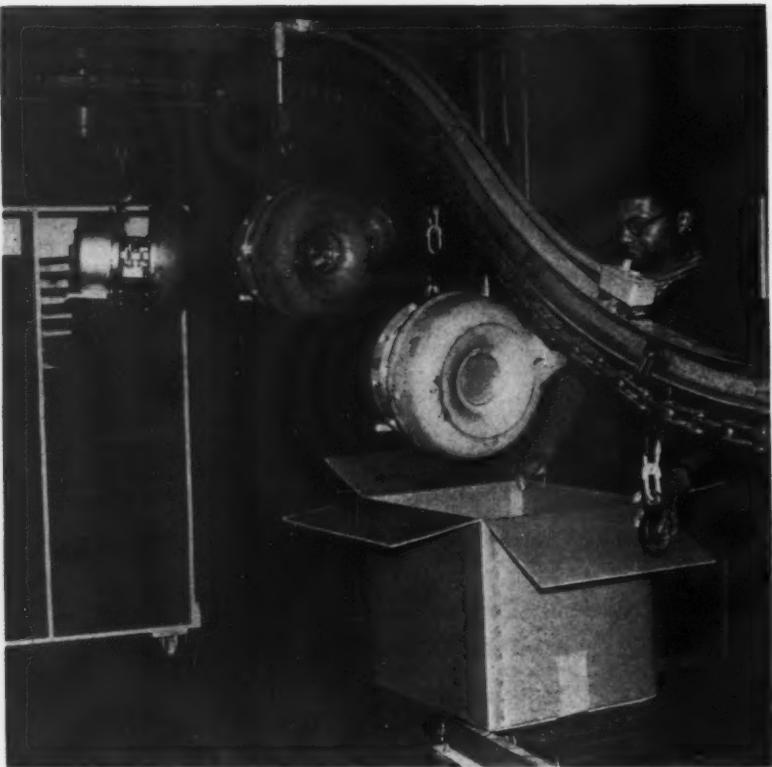
CHANGE FROM ROLLER TO OVERHEAD CONVEYOR is made easily using a hydraulic lift installed as a section of the roller conveyor at AiResearch's "new" plant.

for less set-up work, greater speed, and minimizes machine operator requirements.

The line on which the turbocharger housing components are machined and drilled is a good example of this type of shop layout. Three Bullard Cut Masters (a 30-in. and two 26-in. models), and two Potter & Johnson Automatic Chuckers accomplish the initial machining and contouring in progressive stages. Next, the housings pass to a line of five multiple drills (three Cincinnati and two Natco), each tooled for a specific multi-drill operation on the component. Thus each multiple drill setup is used without change for each production order of parts. Several specialized precision machines, performing only one operation each, are in use. An Avey automatic boring machine, for instance, bores the compressor housing unit, and a Cincinnati surface broach prepares the turbocharger bearing carriers.

Conveyorized handling is fast

At the end of the shop line all turbocharger parts, whether arriving on pallets, via roller conveyor, or in batch lots from some specialized operation, are transferred to a single overhead conveyor. This conveyor travels first through an automatic washing machine where all oil, grease, and shop grime is thoroughly removed. When parts emerge from the washing machine, some are transferred to an



QUICK AND EASY CARTONING starts with this dip in overhead conveyor where packager simply "catches" each turbocharger as it comes off the assembly line and enters the shipping department ready to go.

other overhead conveyor leading directly into the assembly department. Parts requiring in-process painting are transferred to a roller conveyor which carries them into a paint room adjacent to the machine shop department.

Built-in finishing system

This in-process finishing consists of a coating of high heat-resistant aluminized paint both to increase the resistance of the part to heat corrosion, and to act as an excellent "ground coating" for any finish coat the ultimate turbocharger purchaser wishes to apply. The parts are sprayed in a 6-ft. water-wash paint booth, then placed upon a palleted truck. When the truck is full, it is pushed directly into an electric drying oven operated at 375 deg. F. Drying time is 20 min. After drying, the palleted parts are removed from the oven, and the truck is wheeled to a point where the painted parts can be transferred to the conveyor leading into the assembly department. This in-process finishing department blends very nicely with the shop production line, and painting the parts requires but a slight "detour" in the general

flow toward the assembly area. It is much handier and more efficient than transporting the parts to an outside painting department, then back again into the assembly area.

Two final assembly lines are in operation in the assembly department, one for each of the turbocharger models produced. All parts entering the assembly department from the machine shop go first to the assembly scheduling area. Here the exact parts required to assemble a completed turbocharger are selected and placed on a pallet. This pallet starts along a roller conveyor line which runs at right angles to the ends of the two assembly lines. An upright arm properly placed on the front end of each pallet contacts an overhead "turn off" guide at the assembly line for which it is intended.

Two conveyors per assembly line

Each assembly line is served by two conveyor systems — a workbench-height roller conveyor system, and a continuous overhead conveyor directly above the roller conveyor. This overhead conveyor threads both assembly lines and the inspection and shipping departments. The roller conveyor con-

tinues onward the length of each assembly line and contains the parts to be assembled. The overhead conveyor then picks up the assembled turbocharger (or in some cases partially assembled units to convey them to a new assembly location) and transports it to the shipping location. Partially assembled turbochargers on the overhead conveyor may "free-wheel" until they are needed at the next assembly station. Thus, the overhead conveyor provides temporary storage space for in-process assemblies.

Easy-to-reach conveyors

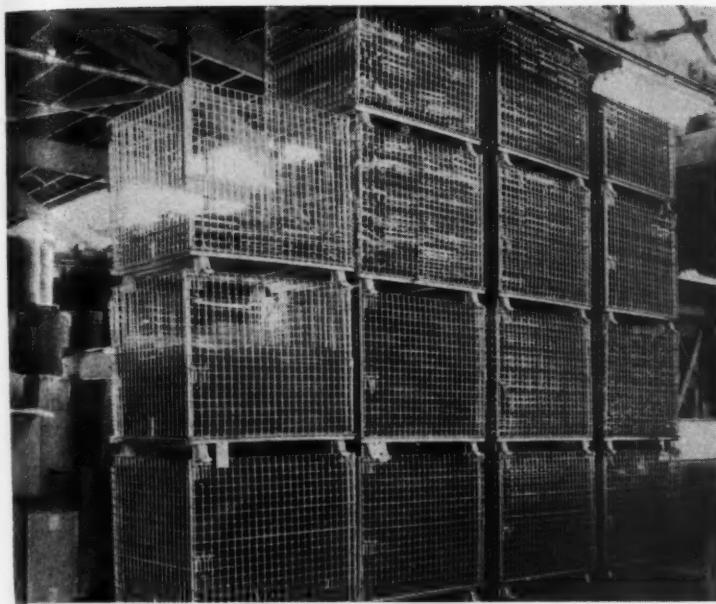
As the roller conveyor is installed at workbench height, it makes it very convenient for assembly line workers to slip required parts off onto their workbenches then back again after assembly. The roller conveyors are provided at intervals with "lift" sections that can be hydraulically elevated by actuating a lever. Thus, when it becomes necessary to transfer a partial or completed assembly from the roller conveyor to the overhead conveyor, it is merely shoved onto one of these lift sections and hoisted so that it can be conveniently hooked onto the overhead chain.

The overhead conveyor travels through the final inspection department before it reaches the shipping area. Here, all turbochargers receive final inspection while suspended from the conveyor line. Just beyond the inspection department, the turbochargers are conveyed into the shipping area.

Game of "catch-the-turbocharger"

Here, a very convenient "kink" has been worked out. Just as the overhead conveyor enters the shipping department, it dips sharply downward and lowers the turbocharger directly into a shipping carton properly placed to receive it. Thus the only manual effort necessary in boxing the product is to unhook it from the conveyor line. This operation is so simple that the shipping carton may be slipped into place just as a turbocharger is being lowered into it. This makes it simple to bypass partially assembled units which are "free-wheeling" on the line.

The carton to receive the turbocharger is set in place on one end of a short roller conveyor line. The boxed turbochargers are then rolled along this conveyor and directly off onto a shipping pallet. The units are shipped eight to a pallet, securely metal-strapped in place to minimize the possibilities of in-transit damage.



SPACE SAVING of 1,000 sq. ft. was realized from a change to wire pallet bins for in-process product storage at Washington Steel Products' Tacoma plant. Assorted corrugated boxes were used before.



A REACH-FORK TYPE LIFT TRUCK permitted plant operators to gain warehouse space by narrowing aisles.

Space is where you find it

...the trick is knowing where to start looking. Here are four examples of outstanding space gains in a Northwest plant.

WESTERN plants are constantly outgrowing expected space requirements and, generally, they turn to either or both of two commonly accepted solutions to the problem. Larger shells in which to put their expanded facilities are built or facilities are shifted around to get better utilization of the existing shell. However, there are other effective approaches to the problem. These involve planning, analysis of problem areas, and training of personnel.

Engineers at Washington Steel Products, Inc., in Tacoma, Wash., have applied these approaches and gained space in many areas of their 110,000-sq. ft. plant. This plant manufactures about 570 different hardware products. They are broken down into four basic groups: cabinet hardware, architectural hardware, rolling door hardware, and "Kitch'n Handy" items such as spice racks, towel racks, etc. Approximately 325 people are employed by the manufacturing division. Here are four examples of how planning, analysis and training have not

only provided more plant space, but reaped other operational savings as well.

Narrower aisles with new truck

The first space-saving action developed from lack of sufficient lift truck facilities to handle expanding production and increased warehouse demands. The problem of selecting the proper truck to do the job was turned over to the engineering department.

It didn't take long for engineering to see that, through the variety of service found in modern fork lift trucks, a space-savings could be realized as well as a more effective materials handling system through purchase of the right unit.

Space utilization was viewed two ways during the selection of a new lift truck. First way was to gain space through reduction of aisle sizes and the second was by taking advantage of height. Several types of fork trucks designed for narrow aisle operation were considered, but by observation of other warehouse operation and trial uses of various units, it was determined that the reach-fork type truck was best suited to Washington Steel Products plant needs.

An extremely compact unit was purchased. The operator stands at the back of the truck. Front wheels are located out in front of the body of the truck. It is similar to a straddle truck but, instead of the wheels straddling the load, the forks are extended to pick up the load. Then the load is

AUTHOR OF THIS ARTICLE



**JOHN C.
DIMMER**

Plant Engineer
Washington Steel
Products, Inc.
Tacoma, Wash.



REDUCING CARTON INVENTORY (previous assortment caused the space-eater pictured above) was accomplished by redesign of the cartons to afford packaging of 17 different items in only six sizes of cartons.

drawn back and moved, requiring no more room than the truck itself.

Purchase of the new truck meant that a new warehouse layout could be engineered. Increased space utilization amounted to 1,200 sq. ft. As a result of the reaching action of the new lift truck, aisle space was reduced to 6½ and 7 ft. from a previous 10 and 11 ft.

Inventory control tightened up

Another space savings was recently realized—and is constantly adding more space—as a by-product of a complete new IBM raw material and in-process inventory program installed at Washington Steel Products early this year. The IBM system provides weekly reports on inventories. Maintaining such reports effectively meant gaining close control over receiving and issuing of the stocks involved.

A material control department was established with a foreman in charge of all plant material handlers. Materials can only be issued upon presentation of a stock requisition card, and the foreman in charge supervises all areas in the plant related to receiving and storage of raw materials and in-process materials.

The by-product result of the material control program came from the many hours spent by the foreman studying his storage and handling problems. Weekly he comes up with new facility arrangements that save hundreds of square feet of valuable

plant space. Systematic storage and marked aisleways reduce handling time and improve plant appearance. Because these projects are undertaken as fill-in work between peak periods, these improvements are accomplished at no extra expense.

Study of the advantages to be gained through a change to wire pallet bins for in-process product storage has recently been completed at Washington Steel Products. Estimates indicate that the same storage job that has been accomplished in the past using assorted corrugated boxes is now being accomplished with the wire collapsible units in 1,000 sq. ft. less space.

The Kitch'n Handy line of products manufactured at this plant are all light bulky items. Made of flat wire with spot welded joints, the unfinished products are fabricated in Seattle and shipped to Tacoma. The corrugated box containers previously in use were hand-unloaded and stored one or two levels high, depending upon the load they will take, until ready for plating and packaging. Awkward to handle and difficult to store, the assorted-size boxes required a storage area of 2,000 sq. ft. usually. Furthermore, product damage was high.

Wire pallet bins stored flat

Wire pallet bins about 40x48x36 in. in size that can be stacked independent of load are now being used. They can be knocked down and stored flat, thus

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progressive die).

3. Ease of machining large diameter threads with leaded brass.
4. The excellent surface that can be developed for chrome plating (Photo above right shows strainer after it has been trimmed, dimpled, threaded and plated).
5. The consistent uniformity and quality of Revere Leaded Brass Strip over the years.

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reducing required storage space for empties.

Other advantages of the wire mesh containers are quick-glance identification of contents, easy loading and unloading by fork truck, and a vast reduction in amount of handling damage. The change to these units will probably pay for itself in less than one year.

Redesigned cartons cut inventory

Another sizable space saving was realized through inventory reduction. Through careful design, the number of cartons required to package Washington Steel Products' Kitch'n Handy line has been reduced to a total of six. Previous packaging procedures called for 11 different cartons to handle the 17 items in the line.

Depending upon sales requirements, either 6 or 12 individual boxes were packaged in each of the 11 carton sizes. Due to the evolutionary progress of the firm, only a few of the cartons were still doing the job for which they had originally been designed. New design consideration involved a low volume that created a need for container flexibility and multiple usage wherever possible. Results are that six cartons now do a better job and require much less total storage space. Purchasing cartons in a smaller number of sizes also provided economies.

SQC halves defect possibilities

Combined with regular production-flow inspection techniques, a newly launched statistical quality control program has cut by 50% the possibility of defects in instruments at the Richmond, Calif., plant of Berkeley Div., Beckman Instruments.

New to the electronics industry, according to division manager Thomas Allinson, the SQC program independently covers the plant's seven regular inspection points in the manufacturing process. Quality levels are plotted on special charts to provide a continuous picture of conditions at every stage.

Any increase in the number of defects shows up immediately with the statistical system and can be investigated in early stages. A marked decrease in defects indicated at any manufacturing stage shows engineers that they should check regular inspection procedures.

Statistics gathered in chart form can also be compared to quality levels at other plants to locate points where production methods might be improved.



The same trucks that do the stacking also transport appliances from end of assembly line to storage, and from storage to loading docks. Two-way radio dispatch system expedites movement.

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General Electric has a fleet of 13 such trucks at this installation and is adding 5 more. This new concept in appliance handling completely eliminates the use of pallets—which would have meant an additional investment 8 or 9 times the cost of the trucks. The absence of forks and pallets makes possible stacking one tier higher and reduces aisle space required, thus increasing storage capacity more than 25%.

The trucks have a total lift of 242 inches. Appliances are handled 4 per load for the bottom 2 tiers, and 2 per load for upper tiers. Gravity sliding back-rest aligns loads perfectly with tiers below and protects them from impact damage. Side-shifter butts loads snugly against adjacent stack for lateral alignment.

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WESTERN INDUSTRY — December 1956

KNOW-HOW NOTEBOOK

Part 1

selected production and maintenance ideas for Western plant operating executives

Catalytic purifier adapts gas trucks for food plant use

INVESTING \$200 per lift truck for a catalytic purifier has saved thousands of dollars in over-all lift truck investment for Apple Growers Assoc. in Hood River, Ore. Savings is actually derived from the lesser initial investment required for gasoline powered lift trucks, which would not be usable in the apple processing operation without the exhaust purifying unit.

Known as the OCM catalytic exhaust, the device replaces standard acoustical mufflers on internal combustion engines. Catalytic action causes the transformation of deadly carbon monoxide and hydrocarbons to harmless carbon dioxide and water. The transformed exhaust product is obtained through an oxidizing action.



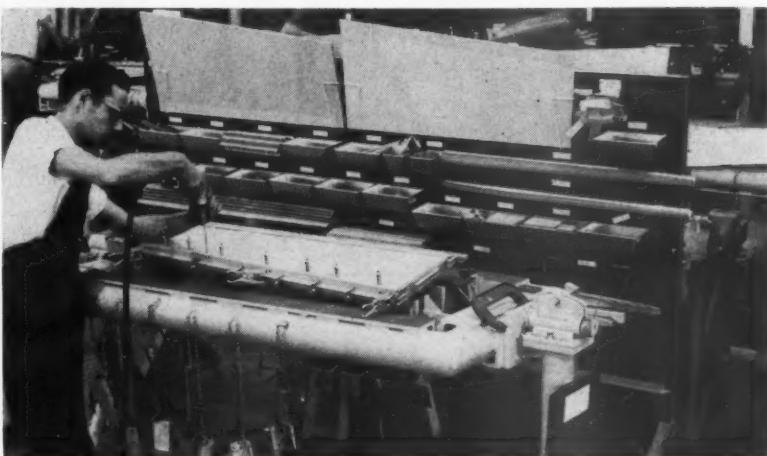
CATALYTIC PURIFIER mounted in place of acoustical truck muffler eliminates fumes.

Eight lift trucks used in various indoor operations in the five-plant system have been equipped with the catalytic exhaust units. They operate in rooms as small as 30 x 120 ft. in size and with as little ceiling height as 7

ft. Installation of the purifiers has eliminated employee complaints of nausea and headache caused by too high a concentration of carbon monoxide. Thus, employee efficiency and morale have improved in addition to savings in initial lift truck costs afforded by the catalytic exhaust units.

Maintenance of the catalytic units is simply a matter of replacing cart-

ridges once each year. The replacement cartridges are obtained from the manufacturer of the units, Oxy-Catalyst, Inc., of Wayne, Pa., on a low-cost exchange basis. The manufacturer reports that more than 3,000 industrial trucks, both gasoline and LP-gas powered, are presently equipped with catalytic purifiers. Most of these trucks are used by the food processing industry.



PARTS REQUIRE 35% LESS SPACE for assembly-line storage and production has been speeded greatly as a result of Rohr Aircraft's new on-line pegboard storage set-up.

Pegboard permits faster, less space-eating assembly at Rohr

PRODUCTION at Rohr Aircraft's Riverside, Calif., plant has been boosted time-wise and parts storage requires 35% less space since the plant engineering department devised a way to use peg panel to keep assembly parts handy. Growing from an engineer's observance of a hardware store display rack, the hook racks fit to a "T" the need for streamlining of production operations in Rohr's Boeing KC-135 jet aerial tanker project.

Feet or casters were mounted on sheets of the peg board that has be-

come such a boon to the do-it-yourself enthusiasts. Pans spot welded to standard hooks fitted to the peg board hold small and odd shaped parts. Larger parts are suspended from special hooks made by the plant.

Thus each assembler has a supply within reach of each of the many parts that go into a subassembly. Formerly stored in bins, it was time consuming for assemblers to obtain the needed part and storage of the parts consumed extra room. Caster-equipped hook racks can be used to transport



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KNOW-HOW NOTEBOOK

Part 1 continued

parts to and from various departments of the plant and no change of container time is required.

So effective was this assembly innovation that the application of similar racks to a number of assembly stages at Rohr's Chula Vista, Calif., plant are now under study.



A CUSTOM-MADE OVEN is Pan American's key to making plastic parts design changes.

New oven speeds plastic aircraft parts production

PLACE AT WHICH the aircraft industry has advanced design of aircraft and parts is typical of Western production problems. A combination of design changes and previously unheard of demand increases has given the Western plant operator a problem of setting up production facilities capable of meeting this changing and schedule-chasing manufacturing picture.

One facet of the aircraft industry that has had to cope with the problem is the airlines maintenance operation. At Pan American World Airways maintenance base in South San Francisco, Herb Montoya, wheel shop foreman, met the situation head-on with an industrial oven that could provide a solution to other similar manufacturing operations. First, to meet the problem of an ever changing parts-design situation, he made one section of his shop into a plastic and Fiberglas parts manufacturing and repairing area. The section is oper-

Three existing crane-ways permit maximum use of floor area.



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New MonoRail section of versatile up-and-over system.

A newly engineered section was added to three existing MonoRail craneways in this bar stock warehouse. As a result, incoming material can be picked up from a car and transported on this highly efficient overhead system to storage area. When the raw stock is needed, this up-and-over system has it there on schedule. If you have a materials handling problem, call your nearby American MonoRail engineer. He is qualified to help you answer it.

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Photos courtesy of Super Steels, Inc., Chicago, Ill.



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KNOW-HOW NOTEBOOK ... Part 1, continued

ated by master mechanic Ben Schweickert.

With the new shop, parts were turned out on a production line basis when the engineering department sent down modifications of existing parts or new designs for replacement parts. Such items include, for example: plastic seat parts, light diffusers, escutcheon plates, astrodomes, switch plates, electrical control boxes.

However, the parts were not being produced in the new shop rapidly enough. Orders came so thick and fast that the shop soon realized a need for a more efficient oven than the electric model in use to heat the plastic blanks before forming them on nearby presses.

The problem was turned over to the Montague Co. in San Leandro, Calif., builders of commercial cooking equipment. Although the firm is not in the industrial oven business, it has designed many special ovens in the past.

Installed about five months ago, the Montague oven has enabled stepping up of the cycling schedule from once each 10 min. to once each 2 min. Now, one operator can turn out parts just about as fast as he can move efficiently.

The gas-fired, thermostatically-controlled unit is 3 ft. deep by 4 ft. wide and is divided into four ball bearing-supported drawers in stacked arrangement.

"Scoreboard" cuts waste-losses



PUTTING A PRICE TAG on waste has really produced results at the Los Angeles plant of Drayer Hansen, a division of National-U.S. Radiator Corp. Problem was the age-old dilemma of trying to make production workers aware of the cost of that scrapped part or "too-small-to-save" piece of waste material. However, when the "waste board" shown here was posted with a sample of each commonly wasted item with price tags to indicate the rate at which the money gushed down the drain when each was wasted, operating economics began to present another picture. An accompanying chart indicates the total dollars lost through waste.

How to avoid bolt losses from improper wrenching

HERE'S A FASTENER application tip from people who have given plenty of study to the use of bolts and nuts—their manufacturers. Improper wrenching is the chief

cause of poorly fastened rigid joints. Fastener engineers at Russell, Burdall & Ward Bolt & Nut Co. report that a bolt never again has to work as hard as it does during wrenching up of a rigid joint. It must provide sufficient clamping force on the joined members, and at the same time withstand torsional stresses and adjust itself to loading conditions.

To keep a joint tight, residual tension in the bolt must be set up. This is the force left within the elongated

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THE **Lufkin LINE**
OIL FIELD PUMPING UNITS

ABOUT MONEY, MICE AND MACHINERY

At some time or another, nearly everyone has toyed with the idea of making easy money or of finding sudden riches. Things like—Pick's fabulous uranium discovery, high on the Colorado Plateau, or the Gold Rush of '49, or holding the winning ticket in The Irish Sweepstakes for a cool \$100,000.00.



V. J. Fawcett

These sources of wealth may be measured as a meager stream in a desert Arroyo compared to the cataclysm of cash that awaits those with foresight, faith and a pair of white mice.

Let me explain. Last week I went shopping for a white mouse for my boy's Biology Class. Ronny said it would cost about two bits. When I left the pet shop, my investment totaled \$6.97. The mouse—25c. One mouse house—\$4.95. One water bottle—75c. One sack of mouse morsels—50c and a book on "The Care, Training and Raising of Mice"—25c, plus tax—27c=\$6.97.

The book is invaluable and points the way to riches. See what happens. Starting with only one pair and assuming an average litter of eight, and for the sake of argument that these eight are four pairs 60 days later. Four pairs plus parents, or five pairs total which produce—60 days later—20 pairs plus parents and so on—or a total for the year of 15,625 pairs or 31,250 individual mice (conservative estimate). Six months more at this rate, and the number reaches nearly four million.

Four million mice stretched nose to tail (say 7" per mouse) works out to about 450 statute miles, or roughly the distance from Los Angeles to San Francisco (give or take a mouse or two). Financially, your "take" is terrific. Furnishing customers all the accessories as outlined above, based on one mouse to a house, that's 4,000,000×\$.97 or \$27,880,000.00 for 18 months operation.

Next month we'll discuss making money with Lufkin High Speed Gears, Lufkin Cooling Tower Gears, and other Lufkin Gear Products.

V. J. Fawcett

Write for new G-4 Gear Bulletin

Lufkin FOUNDRY
MACHINE COMPANY

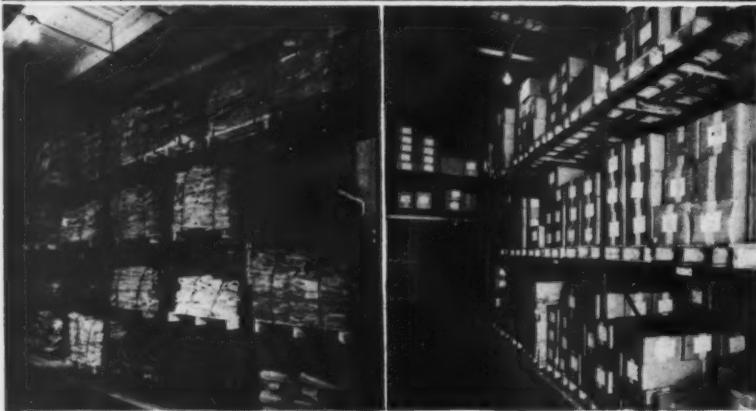
PACIFIC COAST DIVISION
5959 S. Alameda St., Los Angeles 1, Calif.

NORTHWEST SALES AND SERVICE
J. W. Minder Chain and Gear Co.
307 So. East Hawthorne Blvd.
Portland, Ore.

Dallas Lufkin, Texas New York

BAUER & BLACK
Division of The Kendall Co., Chicago

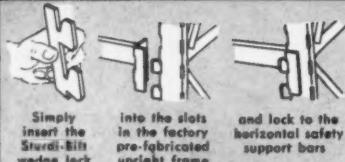
"Our Sturdi-Bilt Adjustable STORAGE RACKS* will pay for themselves in only 15 months!"



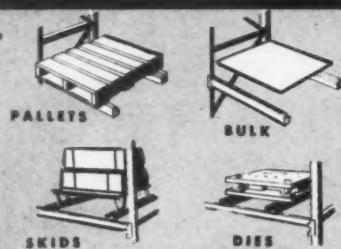
Only 3 Basic Parts



WITH EXCLUSIVE Float Wedge Construction



Instantly Interchangeable for



Sturdi-Bilt Engineering Co.

2501 Peterson Ave., Chicago 45, Ill.

... for more details, circle No. 42 on Reader Service Postcard

THE SECRET

Patented "Float Wedge Construction!"

Bauer & Black chose Sturdi-Bilt Adjustable Storage Racks because of their unusual flexibility, quick installation and instantaneous adjustability—WITHOUT TOOLS, BOLTS, NUTS, ERECTION WELDING OR SPECIAL LABOR!

Sturdi-Bilt's unique assembly principle—"FLOAT WEDGE CONSTRUCTION"—provided operating advantages possible no other way—INSTANT RESPACING, REARRANGEMENT, EXPANSION AND RELOCATION—at any time—NO TOOLS—NO PARTS LOSS!

A 33 1/2% SPACE SAVING!

In one section of the warehouse alone, 12,000 sq. ft. of storage was condensed to 8,000 sq. ft. with the Sturdi-Bilt Racks.

LESS HANDLING!

Pallets are now handled individually, permitting complete merchandise selectivity and stock rotation. This, plus the simple adjustability of the pallet opening heights and widths and top loading, make all space usable, easily accessible storage space. This is why Bauer & Black is expanding the use of Sturdi-Bilt Adjustable Storage Racks—What other system can return its full cost in space and labor saving in so short a time?

WRITE FOR DETAILS

Let us prove how this new time-saving, money-saving, work-saving storage system can benefit your company too!

*U.S. Patent No. 2760650 WI-12
Other patents pending

DISTRIBUTED BY

Andrey Co., 2479 Fletcher, L. A., Calif.
M. E. Canfield Co., 419 E. 3rd, L. A., Calif.
Green-Penny Co., 421 E. Washington, L. A., Calif.
Green-Penny Co., 2211 San Pablo, Oakland, Calif.

KNOW-HOW NOTEBOOK

Part 1, continued

bolt after tightening that tends to return it to normal, thus continually clamping the material between bolt and nut. A bolt stays tight as long as residual tension exists—that is, until the bolt returns all the way to its original length.

It's easy to determine when a bolt has been stressed to much. A steel bolt will stretch within its elastic limit an amount equal to 0.001-in. per in. of grip length for each 30,000 lb. per sq. in. of load. By using a micrometer, you can tell how much a bolt has been loaded and when it has been overstressed.

To figure the approximate torque (inch-pounds) for a bolt, multiply the bolt load in pounds by the diameter in inches by 0.2. Example: A $\frac{1}{2}$ -in. commercial bolt can carry a load of 4,950 lb. The proper working load for this bolt is 60% of 4,950 lb. or 2,970 lb. Therefore torque equals 297 in.-lb., which translates into a load of 37 lb. pull on an 8-in. wrench.

Air-powered saw boosts plastic trimming speed



ABOUT \$10,000 IS BEING SAVED EACH YEAR at the Convair Division of General Dynamics Corp., in San Diego, Calif., through use of a single reciprocating pneumatic saw. The air powered jigsaw saws are producing these savings in plastic tool trimming operations. Former method was to trim the laminated plastic tools with a band saw, hand hack saw or drill motor jigsaw adapter.



In an average month, International Sales Company will ship several thousand "Western" and "Atlas" gas furnaces from its San Francisco plant. With a 10-year guarantee on each unit, workmanship and materials must be uniform top quality, inside and out. At left: A 400-ton hydraulic press stamps out smooth, rounded casing panels from 22-gauge USS Cold Rolled Sheets. In the bottom picture, 16-gauge steel baffles for heating elements are being seam-welded. The company says this copper-bearing USS Cold Rolled Sheet "takes beautifully to electric welding."



If the steel's right, you're money ahead

... if it's wrong, rejects and customers' complaints are the usual result. But the *one right steel* can lower your production costs, as it did for International Sales Company, San Francisco. According to President James Tuck, "Since using USS Cold Rolled Sheets, our dies have lasted appreciably longer . . . the uniform quality of USS steel keeps production running at a smooth clip." With fewer die replacements and uninterrupted production, International is money ahead using the *one right steel* . . . United States Steel.

Isn't there a place in your plant where the *one right steel* could be saving you money? One call to Columbia-Geneva could bring the answer to your problem.

Free: steel sheet calculator!

UNITED STATES STEEL CORPORATION

COLUMBIA-GENEVA STEEL DIVISION

120 MONTGOMERY STREET

SAN FRANCISCO 6, CALIFORNIA

Please send the free calculator that shows weight per sheet and bundling schedule for standard sizes of galvanized and uncoated steel sheet.

Name _____

Address _____

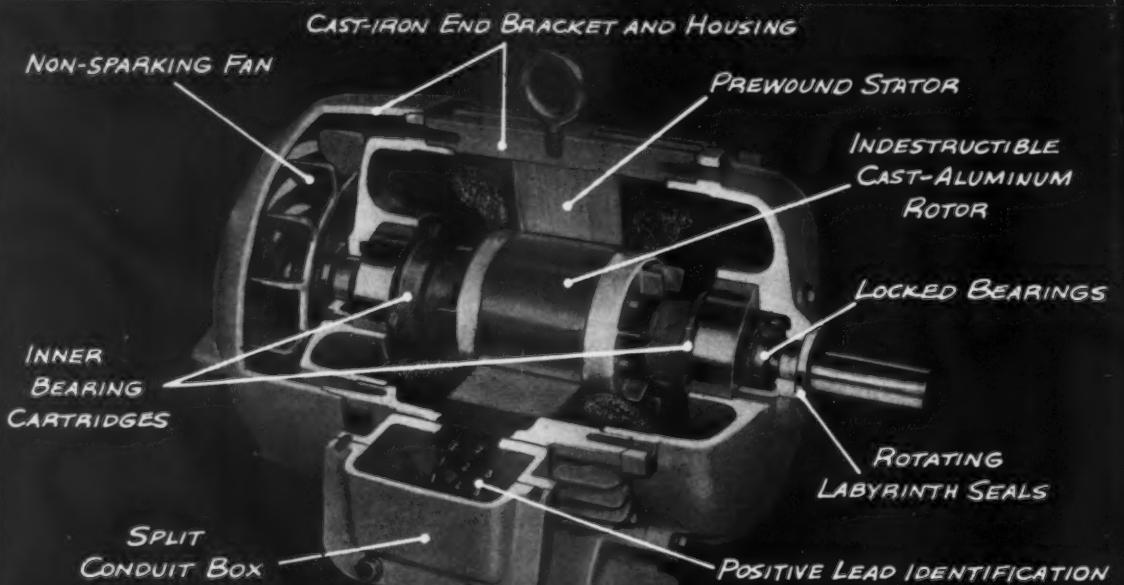
City _____ State _____

USS Steel Sheets

UNITED STATES STEEL

... for more details, circle No. 43 on Reader Service Postcard





Are you getting all these extras
in the motors you buy?

Louis Allis gives them to you in the
new L. A. enclosed and explosion-proof motors

For years, Louis Allis has specialized in special motors for many of industry's toughest drive problems. Such installations call for extreme care in both motor design and manufacture—care that has become a habit with us. We build our enclosed and explosion-proof motors with the same special care.

What does this mean to you? It means that you get a motor with extra features—a motor that runs better, lasts longer. Here are a few of the extra reasons why:

- These new motors carry Underwriters' label for use in four groups of hazardous locations—Class I, Group D, and Class II, Groups E, F, and G. This four-group approval for a single motor simplifies your stocking problem.

- New, exclusive phenolic impregnating varnish provides high thermal resilience and resists aging, prolonging the life of the motor.
- Inner bearing cartridges lock bearings to end bracket and form explosion-quenching seal along the shaft. Inner race of bearing locked to shaft, reducing end play—an extra quality feature.

- Rotating labyrinth seals keep dirt and moisture out of the bearings—keep grease in.

There are many other features such as a new diagonally split conduit box, sturdy cast-iron construction, positive lead identification, non-sparking fan. Our new bulletin No. 1700 shows why you get extra value for your dollar in a Louis Allis explosion-proof motor. Write for your copy.



New LA line explosion-proof motors are available in rerated frame sizes 182 through 326U, and in ratings of 1 to 30 hp, 3 phase, and 1 to 5 hp, single phase. Also available with Underwriters' approval for Class I, Group C hazardous locations.



THE LOUIS ALLIS CO.
MILWAUKEE 7, WISCONSIN

EP-102
... for more details, circle No. 44 on Reader Service Postcard
WESTERN INDUSTRY — December 1956

KNOW-HOW NOTEBOOK

. . . Part 2

50 BEST LIFT TRUCK MANUALS

—yours for the asking

THIS MONTH'S unique WI self-service library is made up of 60 how-to-do-it manuals covering best methods for selection, operation, and maintenance of all types of powered industrial trucks. From the concise reviews printed on pp. 63-68, you may select those manuals that promise to be of greatest usefulness in solving

your materials movement problems of today and tomorrow.

Collected during the past three months by WI editors, these outstanding manuals are offered free of charge to production and plant operating men in Western plants, by special permission of the manufacturers who published them.

You are invited to check the listings and select those manuals that appear to offer the most timely help with your materials handling problems. Circle appropriate numbers on this month's WI Reader Service Postcard (page 69), and we will be glad to see that you obtain your entire selection promptly.

Work kit for performance data application

This work kit for application of standard performance data for fork lift trucks contains several exhibits illustrating standard techniques developed as a result of a research project sponsored by the Yale Materials Handling Division. Exhibits treat, for example, development of element symbols for basic truck motion elements, plant layout, minimum pallet travel, maximum pallet travel, and standard time data. Blank work sheets are included for your own use. *Yale & Towne Manufacturing Co.* . . . for your copy, circle No. 251

How to keep your fork lift rolling

"Keep 'Em Rollin'" is a 56-page manual for the mechanic and fork lift operator, designed to help them understand their machines and keep them in good order. The manual is divided into three sections, the first on operating instruction giving methods of putting the various machines into operation. Section 2 illustrates lubrication and inspection and is arranged in time orders of 8, 40, 300, and 1,000 hours of operation. The final section consists of lubrication charts and inspection and service order sheets to help check the items as they are serviced. *Clark Equipment Co.* . . . for your copy, circle No. 252

Case histories on cutting materials handling costs

"The Materials Handling Cost Cutter" is primarily a notebook of 25 case histories showing how money was saved in various industries through the use of Automatic's handling equipment. Each case history presents a problem and gives the solution both in text and pictures. A small section is also devoted to truck attachments. Also included is information on how to find your materials handling costs, cutting costs, materials handling flow-process analysis and a blank flow chart so that you can make your own analysis. *Automatic Transportation Co.* . . . for your copy, circle No. 253

In-between system for materials handling economy

A pocket sized 20-page booklet defines in-between handling as "short distance hydraulic manipulation of materials too heavy for manual handling yet not requiring high priced power-driven equipment." And then it continues with 20 questions that can be asked to find out where you can use in-between handling methods in your plant. A cross section of the firm's in-between handling units pictures 21 different models. Booklet is well illustrated with cartoon drawings. *Big Joe Manufacturing Co.* . . . for your copy, circle No. 254

How to operate a lift truck (24 pages of cartoons)

Here's a manual designed either to help experienced operators rate their knowledge of lift truck operation or to be a supplement in training a beginner. All phases of operation are covered—starting, shifting, traveling, loading, etc., along with rules of proper operation, basic maneuvers for practice, stacking rudiments, tractor and trailer operation, and discussion of the operator's responsibilities. *Hyster Co.*

. . . for your copy, circle No. 255

Operator's guide for Towlmotor lift trucks

A 36-page pocket sized operator's guide tells you step by step how to handle Towlmotor lift trucks. The truck is pictured with all features pointed out, and equipment, operation, load techniques, safety factors and maintenance of the units are all thoroughly discussed. The book is well illustrated and part of it is in cartoon form. Standard accessories and complete specifications are included. *Towlmotor Corp.*

. . . for your copy, circle No. 256

100-page junior catalog of handling equipment

This pocket sized 100-page catalog covers Barrett's line of materials handling equipment, including fork trucks, Hi-Lift electric trucks, radio controlled trucks, hand lift trucks, and many other materials handling units. Specifications and diagrams for each unit are included, along with small pictures of the various units in action. (*Catalog 535*) *Barrett-Cravens Co.*

. . . for your copy, circle No. 257

42-page notebook on bulk handling Payloader

The Payloader line, designed for excavating, earth moving, towing and general bulk materials handling, is thoroughly covered in a 42-page notebook full of application pictures, lists of special features, specifications and general information. The units may be used with either a bucket or forks. Notebook is expandable. *Frank G. Hough Co.*

. . . for your copy, circle No. 258

Electric trucks designed for narrow places

A 24-page brochure describes Raymond's electric trucks that have been designed especially for narrow aisles and close quarter operation. Diagrams, overall specifications and on-the-job photographs cover straddle trucks, fork and platform trucks. Information on Low-Lift platform and pallet trucks is also included. *Raymond Corp.*

. . . for your copy, circle No. 259

KNOW-HOW NOTEBOOK Part 2

50 BEST LIFT TRUCK MANUALS . . . continued

132-page notebook on Master line of trucks

This 132-page bound notebook on the Master line of materials handling trucks is divided into five sections and indexed for quick reference. The first two sections treat riding type electric fork trucks and walkie forks. Application photographs of the trucks are included, special features noted and specifications given. Other sections cover stackers and cranes, hand-lift trucks and floortrucks. *Lewis-Shepard Products, Inc.* . . . for your copy, circle No. 260

Introduction to Traveloader side loading unit

Traveloader, a side loading handling unit which carries like a straddle truck, delivers like a road truck and stacks like a fork truck, is introduced in two brochures with a total of 20 pages. The Traveloader system is explained with accompanying diagrams showing floor area necessary for the unit. Application pictures, dimensions and specifications complete the first pamphlet, while the second is devoted entirely to large pictures of the unit in operation. *Baker-Raulang Co.* . . . for your copy, circle No. 261

Data on line of small rider trucks

A brochure of eight pages describes the electric powered Ride-a-Man trucks, giving engineering specifications, capacities and dimensions on the complete line. Design features of the models, with illustrations of all major components, are included. Covered are pallet trucks, high and low lift platform trucks, counterbalanced and outrigger trucks, tractors and several special models. *Moto-Truc Co.* . . . for your copy, circle No. 262

Facts and figures on skid and pallet lifts

Skid load-lifts, pallet load-lifts and Load-veyors are briefed in this four-page leaflet, which devotes one full page to each piece of equipment. Dimensions are given in both chart and diagram form and are accompanied by specifications. Special features of each piece of equipment are pictured and treated in more detail; included are types of wheels and different types of conveyor sections. (*Catalog HM-56*) *American Pulley Co.* . . . for your copy, circle No. 263

Gas operated "Stand-up End Control" fork trucks

A line of "Stand-up End Control" fork lift trucks which are gas operated and have automatic transmission is detailed in this six-page pamphlet. The three-cylinder air-cooled engine is described in detail and photographs show operation of the automatic transmission and controls. Specifications are given in chart form and a dozen attachments are pictured and identified. *Lamson Mobilift Corp.* . . . for your copy, circle No. 264

Economic advantages of light duty lift trucks

Straddle base walkie trucks with capacities to 1,500 lb. are covered in this four-page leaflet which stresses the economic advantages of the light duty units. Several different models are pictured in the leaflet, with descriptive paragraphs included. Complete specifications are given. *Economy Engineering Co.* . . . for your copy, circle No. 265

Introduction to electric-hydraulic lifts

A four-page leaflet introduces a line of heavy-duty portable lift trucks which includes fork lifts, platform lifts, straddle forks and straddle rear-swivel fork lifts. Each type is pictured and special features are pointed out in accompanying paragraphs. Prices for each unit are given along with specifications for both pedal-operated and battery-powered lifts. Special treatment is given to a battery-powered electric lift designed for handling drums. *Portable Lift Trucks, Inc.* . . . for your copy, circle No. 266

Selecting and training fork truck operators

This eight-page article is divided into several parts. The first on selecting likely candidates for truck operators covers the Keystone tests, activity tests, mental alertness tests and the importance of periodic physical check-ups. Part 2 outlines a comprehensive five-day training course for prospective operators while Part 3 covers the conduct of the five-day school for operators. Part 4 on general operating techniques and Part 5 on preventive maintenance complete the article. *Hyster Co.* . . . for your copy, circle No. 267

50 pages on mobile materials handling equipment

This 50-page data book covers Mercury's entire line of materials handling equipment, including fork trucks, platform trucks, tractors and trailers. Divided into sections, the book pictures and gives specifications for fork trucks, fork truck attachments, platforms, load carrying trucks, electric trucks and accessories, the trackless train system, electric and gas tractors and tractor accessories, trailers and their accessories. The firm's sales, service and manufacturing facilities are covered briefly at the conclusion of the book. *Mercury Manufacturing Co.* . . . for your copy, circle No. 268

Introduction to Hydroelectric lift trucks

This 20-page booklet is an introduction to the Hydroelectric line of lift trucks, including pallet, platform, tractor, straddle stacker and special types. Each type is pictured alone as well as in use and specifications and dimension diagrams are given. Power unit is treated separately in detail, as are special features like finger tip control, sealed alloy gear drive, twin drive wheels and parking brake. Selection of batteries and charging equipment is discussed. A partial list of firms using the trucks concludes the book. *Lift Trucks, Inc.* . . . for your copy, circle No. 269

Picture book on heavy-duty handling equipment

This picture book shows the eight different units in the Silent Hoist Lifttruck and Lift-O-Krane line of heavy-duty materials handling equipment. Each unit is pictured in action handling such things as lumber, tanks, steel and concrete. Pictures are accompanied with explanatory paragraphs. Specifications for all units are given, along with dimensions and diagrams. (*Booklet 77B*) *Silent Hoist & Crane Co.* . . . for your copy, circle No. 270

Spec sheets on gas-powered Handler line

A group of specification sheets on the Handler line, a group of gas-powered materials handling trucks, gives performance data, lists special features and pictures the units. Floor diagrams showing area necessary for operation are given also. *Colson Equipment & Supply Co.* . . . for your copy, circle No. 271

Specification sheet for 3-in-1 lift truck

Diagrams and specifications for this three-way hydraulically operated lift unit are given in a two-page sheet, which also lists the special features. The unit is pictured in use as a platform loader, shop boom and fork truck and operation as each is explained. *Unit Manufacturing Co.* . . . for your copy, circle No. 272

Spec sheets on Erickson's workhorse trucks

Both large and small lift trucks in Erickson's line of "workhorses" are detailed in this group of specification sheets, covering the Junior Workhorse of 2,000-lb. capacity for indoor or outdoor use, the yard truck, two units for extra heavy-duty use, a platform truck and the Power Kart. Units are pictured and diagrams and general information given. *Erickson Power Lift Trucks, Inc.* . . . for your copy, circle No. 273

Spec sheet for gas-powered Prime-Mover

A specification sheet for the gas-powered Prime-Mover also gives information on the engine, transmission, tires, brakes, steering and dumping control. Prices are included. A separate brochure illustrates a few of the fields in which the Prime-Mover can be used, including foundries, warehouses, materials handling and maintenance. *Prime-Mover Co.* . . . for your copy, circle No. 274

Five data sheets on Champ lift trucks

Three different lift truck models are covered in these five data sheets: the Hi-Low construction lift truck, the Silver Streak for all around plant use, and the Tow-A-Lift. Pictures of all three are included along with paragraphs of descriptive literature and specifications. *Champ Corp.* . . . for your copy, circle No. 275

How to increase fork truck performance

"Making Fork Trucks Do More" is a six-page article resulting from a recent study to establish standard performance data for fork lift trucks. Article shows how truck operating efficiency can be improved, fleet requirements more accurately determined, and plant conditions that increase cycle times better evaluated. A second article with 12 pages is called "How to Measure Fork Truck Performance" and discusses the results of the same study. It is written by Robert S. Rice and reprinted from a national industrial magazine. Well illustrated with charts and diagrams. *Yale & Towne Manufacturing Co.* . . . for your copy, circle No. 276



**Know your AIM*... Gladding Brothers do...
Acme Steel Strapping Bundles Drain Tile**

It takes just 15 minutes to bundle 200 drain tile with Acme Steelstrap at Gladding Brothers Manufacturing Company, San Jose, California tile plant. And then a fork lift requires only half an hour to completely load a delivery truck with bundled tile. (Idea No. S3-8)

Previously four men needed five or six hours to load a truck with unbundled, loose tile. This important time saving is only one of several advantages offered by bundling with Acme Steelstrap. For example: Handling tile bundles is much easier, both for Gladding and its customers. Inventory records are simpler, labeling is faster, and in-transit damage is held to a minimum. And Gladding customers find that fast job-site handling and use-point placement of bundled tile saves time and money, too.

*Know your Acme Idea Man like Gladding Brothers do. Whatever product you handle, your Acme Idea Man can demonstrate the benefits of efficient, economical Steel Strapping procedures. Contact him by writing Dept. WCS-126, Acme Steel Products Division, Acme Steel Company, 4901 Pacific Blvd., Los Angeles 58, Calif. Other West Coast offices in San Francisco, Portland, Seattle.



Acme Idea Man
N.W. Conrad,
San Francisco, keeps
Gladding Bros., and
all his customers,
abreast of
new ideas.

**ACME
STEEL**

STEEL STRAPPING

... for more details, circle No. 45 on Reader Service Postcard



New, lightweight
VICTOR
Duplicutter
MODEL DC 2000

Portable Model DC-2000 cuts circles to 19½" diameter, rectangles to 12" x 35", and metals to 8" thick. Torch accommodates all Victor 1-101 and 1-100 cutting tips, through size 5.

**Flame cuts parts accurately,
saves handling and set-up time,
increases labor efficiency.**

This portable VICTOR DUPLICUTTER weighs only 36 pounds. Operator easily carries it to any work location in plant, field or warehouse . . . thus saving you time and cost of moving materials. Set-up takes minutes only. You lose no time leveling DUPLICUTTER—its magnetized feet use stock being cut as working base. And it's so simple one man easily handles production from 2 or 3 DUPLICUTTERS.

Precise controls and powerful, permanent magnet in template follower enable you to duplicate parts to production tolerances of plus or minus 1/64". Easy, quick interchange of templates makes DUPLICUTTER practical for both long production runs or duplication of single part.

Why not see for yourself how easily the VICTOR DUPLICUTTER handles, how fast and accurately it cuts? Call your VICTOR dealer now and ask him for a demonstration on your job . . . or write us for descriptive Bulletin 353.



For maximum efficiency and safety,
use genuine Victor tips and parts

VICTOR EQUIPMENT COMPANY

Mfrs. of welding & cutting equipment; hardfacing rods, blasting nozzles; cobalt & tungsten castings; straightline and shape cutting machines.

844 Folsom St.
San Francisco 7

3821 Santa Fe Avenue
Los Angeles 58

... for more details, circle No. 46 on Reader Service Postcard

KNOW-HOW NOTEBOOK

Part 2

50 BEST LIFT TRUCK MANUALS . . . continued

Complete training manual for fork truck drivers

A complete 40-page drivers' training manual opens by thoroughly explaining the mechanics of fork trucks and illustrating the section well with photographs. General operating and safety suggestions are given in cartoon style. Several drivers' training courses are plotted and exercises suggested for using them. Score cards and driver's tests conclude the book along with preventive maintenance charts, a sample service order form and inspection sheet. *Clark Equipment Co.*

... for your copy, circle No. 277

Facts on Weld-Bilt "walkie" hydraulic trucks

This 16-page brochure introducing Weld-Bilt lift trucks and skids presents data on trucks with horizontally mounted hydraulic lifting units, heavy duty narrow and wide models, and single stroke mechanical lift trucks, as well as skid adapters for pallet lift trucks. Dimensions and specifications are given for all models, along with many pictures. The booklet concludes with a well-illustrated section on construction features of skid platforms. *West Bend Equipment Corp.*

... for your copy, circle No. 278

Surveys of Towmotor trucks in use

Four job studies detail the advantages gained by using Towmotor lift trucks in a heating equipment manufacturing plant, fruit storage and packing company, leather processing plant, and corrugated box manufacturing plant. Each four-page study pictures the units in use, presents a problem in the plant and shows the solution. (Studies 162-165) *Towmotor Corp.*

... for your copy, circle No. 279

Specs on 3,000 to 6,000-lb. electric forks

Four leaflets give specifications for four different electrically driven fork trucks, ranging in capacities from 3,000 to 6,000 lb. Units are pictured, dimensions and diagrams given, controls and special features discussed. *Baker-Raulang Co.*

... for your copy, circle No. 280

Two booklets on walkie and rider industrial trucks

Two similar booklets, one on ride-a-man trucks, the other on the walkie type, picture different units in the two lines and treat component parts in some detail. Diagrams and dimensions are given, along with specifications. Lift and aisle requirements are presented in chart form for each reference. Each booklet has eight pages. *Moto-Truc Co.*

... for your copy, circle No. 281

Solving the gas vs. electric truck problem

This fork lift fact kit may help you answer the gas vs. electric truck question. It is composed of 12 single fact sheets covering such things as length of truck life, depreciation, maintenance and repair, power costs, and differences between the two trucks. Included also are two truck maintenance report forms so that you can check out your own fork trucks, either gas or electric, and compare your statistics with those in the kit. *Lewis-Shepard Products, Inc.*

... for your copy, circle No. 282

Presentation of electric industrial truck line

Automatic's complete line of electrically driven industrial trucks is presented in this 16-page brochure, which covers fork trucks, platform trucks, pallet trucks, tractors, cranes and other special equipment and attachments. The booklet gives specifications, dimensions, diagrams and photographs for the different models and includes brief information on the firm's engineering and leasing service. *Automatic Transportation Co.*

... for your copy, circle No. 283

Hydraulic lifts for "in-between" jobs

Designed to handle jobs too big to do by hand and too small to justify the use of large equipment, these 1,000-lb. hydraulic lift trucks are detailed in a 12-page brochure. Pictures and descriptive information are given for battery and manually operated hydraulic lifts and special models like the Counterweighter and Telescopic. Specifications for all units are included along with dimensions and capacities in chart form. A single page leaflet details the Challenger, another in-between handling unit. *Big Joe Manufacturing Co.*

... for your copy, circle No. 284

**Another of Garrett's
FAMOUS BRANDS**

STANLEY

**REVOLUTIONARY STANLEY DEVELOPMENT SPEEDS
HAND SHAPING UP TO 10 TIMES, ELIMINATES CLOGGING**

New Stanley "Surform" miracle cutting tools incorporate a new cutting principle in both rasp and plane types. Each unit has 450 separate cutting edges and non-clog openings. Only light pressure is required for smoothing plastics, copper, brass pipe, aluminum, lead, wood and even soft steel. Blades are replaceable.

Stanley is one of many brands of hand tools carried by Garrett Supply in our huge inventory of more than 100 famous brands of all types of tools and industrial supplies. Our service is as good as our stock, so, whatever you need, "Get it from Garrett!"

**HEADQUARTERS IN SOUTHERN
CALIFORNIA AND ARIZONA FOR THESE
AND OTHER FAMOUS BRANDS**

Utica Tools

American Beauty

Crescent Tools Disston

Proto Tools

Ridgid Tools Miller-Falls

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IN LOS ANGELES
LUDLOW 8-7221
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3844 South Santa Fe Ave., Los Angeles 58, California

130 West Madison St., Phoenix, Arizona

GARRETT
SUPPLY COMPANY

a division of **THE GARRETT CORPORATION**



... for more details, circle No. 47 on Reader Service Postcard

KNOW-HOW NOTEBOOK . . . Part 2

50 BEST LIFT TRUCK MANUALS . . . continued

Picture demonstrations of materials handling ideas

A 16-page brochure is devoted entirely to large photographs that serve as demonstrations of materials handling ideas and methods that you may be able to use. Problems treated include maximum use of overhead space, close quarter loading, cold storage problems, operation in narrow aisles and many others. Barrett's materials handling equipment is illustrated. (Booklet 552) *Barrett-Cravens Co.*

. . . for your copy, circle No. 285

Introduction to Pace-Maker fork lift trucks

The Pace-Maker series of fork lift trucks is introduced in this colorful 30-page booklet which treats engineering, design and performance. Various models in the line are pictured and information is given about them, as well as general information on the entire line. Special features are covered in close-up photographs also. (Book SP-23) A six-page sheet on standard specifications for Towmotor fork lift trucks is included. *Towmotor Corp.*

. . . for your copy, circle No. 286

Basic facts about materials handling

A 24-page pocket-sized booklet called "Basic Facts" presents materials handling know-how in simple cartoon-type style, treating such subjects as wasteful handling, warehousing costs, flexibility of fork lifts and costs. A second similar booklet treats safety facts in cartoon style. *Clark Equipment Co.*

. . . for your copy, circle No. 287

Five spec sheets on gas powered trucks

These five leaflets cover five different models in Baker's gas powered lift truck line. Each leaflet pictures the truck, discusses controls, power unit, lists special features and gives complete specifications. Attachments for each model are treated briefly on the final pages. *Baker-Raulang Co.*

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Six booklets covering entire Yale line

Three booklets with four pages each cover the Lift King series of Yale electric fork trucks, with 3,000, 4,000, and 5,000-lb. capacities. Each truck is diagrammed and complete specifications are given. Two other leaflets cover gasoline and LP-Gas fork trucks, giving specifications, dimensions and diagrams. A 12-page booklet on the firm's Worksaver electric truck line includes pallet, platform, fork and tractor types, pictures each and lists special features. *Yale & Towne Manufacturing Co.*

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How to operate a fork truck

This eight-page pamphlet outlines a step-by-step procedure for operating a fork truck. It begins with the choosing of operators, continues through an outline of classroom instruction in proper operation, and then gives detailed instructions for the actual operation. The booklet is illustrated throughout with cartoon drawings and concludes with a section on safety do's and don't's. *Lewis-Shepard Products, Inc.*

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"Sit-down" fork trucks with hydraulic suspension

A five-page booklet describes the construction and operation of "Sit-down" fork trucks of 2,000 to 5,000-lb. capacity with hydraulic suspension and automatic transmission. The Hydra-Lizer system used on the trucks is explained as are other special features. Specifications are given in chart form and special attachments pictured. *Lamson Mobilift Corp.*

. . . for your copy, circle No. 291

WE FORGOT TO MENTION . . .

that all of the bubbling water you recall seeing in the November 1956 issue of WI (as background art on the front cover and behind the water treatment manuals headline in Part 2 of the Know-How Notebook) was compliments of American Water Softener Co., Philadelphia, Pa., who graciously loaned us the attractive and appropriate art work.

There's still time, incidentally, to obtain your selection from among the 50 best available manuals on industrial water treatment and cooling towers. See page 66 of the November issue.—ED.

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65-page price book for all types, sizes of steel

This 65-page price book covering all sizes and types of steel carried by Howard Supply is indexed into nine sections, covering carbon bars, shapes, plates, cold finished material, sheets, pipe and tubes, drainage products, oven products, and nails and wire. A simplified steel products index is located at the front of the book so that information desired can be quickly located. A special feature of the new price book, according to Howard, is the elimination of "extras" for sizes, quantities, finishes, etc., which permits steel users to tell at a glance the net price per 100 lb. for all types of steel in various quantities. *Howard Supply Co.*

... for your copy, circle No. 151

Chart of vulcanized fibre, laminated plastic properties

This is a two-page chart comparing National's vulcanized fibre and laminated plastic on the basis of electrical, mechanical, physical, and chemical properties. A comparison is also made on some general properties and how well the material fabricates. Locations of the firm's sales and engineering offices are given. *National Vulcanized Fibre Co.*

... for your copy, circle No. 152

42-page specification book on Vari-Speed Motodrive

This 42-page specification book opens with general information on motors and instructions on ordering them, followed by several pages of price and horsepower ratings in chart form. A section is devoted to modifications of the Vari-Speed Motodrive. Covered are special motors, controls, and brakes. Book concludes with diagrams and engineering information. (*Catalog M-558*) *Reeves Pulley Co.*

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Photograph book of 130 strapping applications

A 36-page book of packaging contains 130 photographs of strapping applications, as well as a complete review of the firm's products. The booklet includes items ranging from the semi-automatic machine for reinforcement and unitizing of corrugated containers, newspapers and magazines to the strapping used for flat carloads of lumber and packaging of sheet steel. *Gerrard Steel Strapping Division, U. S. Steel Corp.*

... for your copy, circle No. 154

Machine tool uses for abrasive belts

"The Coated Abrasive Belt—Its Use in Machine Tools" is a 24-page picture and diagram book. Contents include information on abrasive belts and backstands, line and station belt polishing, platen grinding with the belts, multi-belt machines, sheet-bar-strip polishers, conveyor feed grinders, swing frame grinders, centerless and drum grinders. Also included are instructions for converting your lathe. *Behr-Manning Co.*

... for your copy, circle No. 155

Line of batteries for electric industrial trucks

A new line of Bould Super Dreadnaught batteries developed to meet power needs of electric industrial trucks is covered in this eight-page brochure. Details of battery construction are given, including Tite-Seal posts, basic Z grids, retainers, separators and protectors. Engineering specifications are also given for the three available ampere-hour capacities—40, 60 and 120. *Gould-National Batteries, Inc.*

... for your copy, circle No. 156

Introduction to G. E. control transformers

A 32-page booklet introduces a line of G. E. control transformers giving voltage ratings, frequency, frame size, weight, applications, prices and specification data. Included are auto-transformers and control panel and machine tool transformers. Accessory information, wiring diagrams and voltage regulation curves for use in selecting the proper transformer for a given application are also found in the book. A special application section covers refrigerator transformers, as well as those for oil well, mine and pumphouse location. (*Booklet 2767A*) *General Electric Co.*

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Murder in the model shop (a 48-page thriller)

"The squeeze was on, the bodies were stacked up and the long sleep lay ahead." And Ernie Razal's trouble-shootin' character's job: not to find the murderer, but to find something to stop the shrieks and demands of a crowd of "bodies stacked up like lasagna noodles" which you will recognize as you and your design engineering friends in quest of an item from the model shop in your plant. This 48-page thriller has been published in a form similar to the soft (but illustrative) covered, dime-store novel. Although Mr. Razal's hero reaches the solution quickly and saves the day, he does so only by passing by, beating off and postponing a multitude of seductive offerings proffered by in-plant lovelies. Oh yes, the solution: why not get a copy by using the WESTERN INDUSTRY Reader Service Postcard. *Servo Corp. of America.*

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Five articles on solving materials handling problems

This 52-page book contains five complete articles devoted to materials handling problems. "Why Mechanical Materials Handling?" is a discussion of materials handling as related to mechanical equipment, while "Which System of Materials Handling?" discusses specific types of systems and their applications. "Your Handling Problem" analyzes the problems of materials transportation with an eye to selecting the correct equipment. Another article shows the Monorail in action, while the final one covers the firm's engineering services. Many application pictures of Monorails and crane equipment are included. *Louden Machinery Co.*

... for your copy, circle No. 159

50 application ideas for steel strapping

This is a picture idea book on steel strapping which shows 50 applications for steel strapping and advances the idea of unitizing, a method of grouping individual products or packages into a single unit through the use of steel strapping. Applications pictured and described include skid loading, palletizing and self-palletizing in shipment and storage of paper products, clay products, metal working parts, and automotive products. Acme's "idea man" service is also described briefly. *Acme Steel Co.*

... for your copy, circle No. 160

G. E. control devices for JIC standards

This 12-page publication describes application features of the control devices built to meet Joint Industry Conference standards. Included is data on the machine tool relay, oil-tight push button, solenoid, limit switch, magnetic starter, plugging switch and pneumatic time-delay relay. Booklet is well illustrated. (Booklet 6317) *General Electric Co.*

... for your copy, circle No. 161

Technical data book on Gripmaster sprockets

The new edition of this technical data book on Gripmaster sprockets offers complete specifications and full selection information as well as prices. Tables are presented for all plate sprockets and hubs as well as information on flexible couplings, weld-on nubs and sprockets, roller chain, and special application items. (Catalog 200A) *Cullman Wheel Co.*

... for your copy, circle No. 162

80-page instruction book for power transformers

Designed for those interested in power transformer maintenance and operation, this 80-page transformer instruction manual covers in detail installation, operation, component parts, maintenance and inspection of power type transformers in all ratings. Information is presented in article form with subheads pointing up important sections. Well illustrated with photographs. *Moloney Electric Co.*

... for your copy, circle No. 163

Aluminum jacketing for tanks, piping systems

"Kaiser Aluminum Insulation Jacketing Materials and Methods" is a 40-page publication giving detailed information on aluminum insulation jacketing for tanks, vessels and piping systems of the petroleum, power, chemical and other process industries. Recommendations for selecting, fabricating and installing the various jacketing components are given. Included are methods for jacketing tanks, vessels and straight runs of piping, fittings and heads, elbows, T's, valves, flanges, reducers, branch connections, expansion couplings, tank roofs, etc. Basic engineering data are presented to help the user evaluate the essential design information and decide what is necessary for a specific job. Illustrated with photographs, drawings and tables. *Kaiser Aluminum & Chemical Corp.*

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Features of Chainveyor's light overhead conveyor

Chainveyor's low cost overhead conveyor is described in a four-page booklet which lists a number of features of the lightweight conveyor and illustrates a number of its uses. Diagrams of tracks and chains are also included. *Chainveyor Corp.*

... for your copy, circle No. 165

Automatic dockboards for mechanized handling

A four-page leaflet gives information about automatic dockboards for loading docks and should be useful to anyone handling plant layout and design and materials handling. Leaflet explains and diagrams the features for both the recess models and the packaged models. *Kelley Co.*

... for your copy, circle No. 166

Specification book on flexible chain coupling

This 16-page flexible chain coupling booklet has been revised and updated; it now includes specifications, dimensions, ratings and application for series DSC, series SA silent chain couplings and series DRC roller chain couplings. Pertinent information about stamped steel covers, plastic covers and split aluminum covers is also tabulated. General information on the purpose and function of flexible chain couplings is given. (Catalog C45) Morse Chain Co.

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Power lubrication for centralized systems

Recent developments in the field are covered in this booklet on power operated centralized lubrication systems. Booklet covers the systems recently adopted as optional factory-installed service accessories by manufacturers of automobiles, truck-trailers and industrial machinery. Covered are descriptions and functions of manual, mechanical and electric automatic controls. Photographs of various installations, diagrammatic illustrations and ordering data are given. Lincoln Engineering Co.

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Enclosed switches for airborne equipment

Seventy-seven switches are discussed in this 24-page booklet covering 12 different families of precision, snap-action aircraft switches. Complete with photographs, dimensional drawings, electrical ratings and technical information, the booklet includes environment-proof switches, hermetically sealed switches, completed sealed cylindrical switches, high temperature switches, enclosed multi-circuit switches. Many of the switches covered are available in a variety of actuator designs and contact arrangements. MicroSwitch Division, Minneapolis-Honeywell Regulator Co.

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Introduction to Flexalarm fire alarm signal system

This pamphlet introduces the Flexalarm fire alarm signal systems and is primarily concerned with the 26 component panels utilized to make up the separate systems together with their associated parts. All the panels are illustrated and described with the advantages of each mentioned. Accessory equipment is included at the end of the booklet. Gamewell Co.

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Data on 10 fortified industrial lubricants

General descriptions, lists of characteristics, and application suggestions are given for 10 different fortified industrial lubricants in this eight-page brochure. Included are multi-purpose grease, open gear and cable lubricant, ball bearing grease, gear oils, worm gear oils, hydraulic oils and several others. Included is a four-page leaflet which gives more complete information on high temperature lubricants and includes seven pictures of the lubricants being tested under different conditions. *E. F. Houghton & Co.* . . . for your copy, circle No. 171

12-page brochure on three-speed reduction styles

Three styles of speed reduction—integral gear motors, speed reducers with separate motors, and speed reducers alone—are covered in a 12-page two-color brochure, which highlights the engineering advantages of the drives and gives information to be considered in the selection of speed reducers. A large cutaway photograph has special reducer features pointed out on it and the booklet contains other large illustrations. *Sterling Electric Motors, Inc.*

... for your copy, circle No. 172

Load center transformers for indoor, outdoor use

Engineering data, weights and dimensions of the firm's complete line of load center transformers are given in this 12-page booklet, which covers construction features of liquid-filled and dry-type units for either indoor or outdoor installation. Illustrations and drawings of typical applications are included, along with descriptions of standard accessories, ratings available, and types of core and coil assemblies. (*Booklet CS-1000*) *Kuhlman Electric Co.*

... for your copy, circle No. 173

Faultfinder locates grounds on energized power circuits

The Brunt Faultfinder, a unit that locates grounds on energized power circuits and helps to prevent shutdowns, is thoroughly detailed in this 12-page brochure. Several different models are discussed and pictured in the first section of the pamphlet; the second part discusses interpretation of signal and determination of fault. Diagrams are given and uses for the Faultfinder suggested. *Parr Manufacturing Corp.*

... for your copy, circle No. 174

Instruments for analysis, control, data processing

A 32-page notebook presents Consolidated Electroynamics' line of instruments for analysis, control and data processing. This includes recording oscilloscopes, digital data processing systems, analog data recording systems, galvanometers, datagraphs, amplifiers and vibration measuring equipment, to name just a few. Each piece of equipment is pictured and explained, with applications suggested. Principles of operation are also included. (Bulletin 1305) *Consolidated Electroynamics Corp.*

... for your copy, circle No. 175

155-page work book for overhead conveyors

This 155-page spiral manual was designed by the firm as a working tool for its overhead conveyor, the Monoveyor. It is divided into 14 sections all indexed for quick reference with plastic coated tabs. Sections include application and design of the Monoveyor, chain and attachments, track, roller turns, traction wheels, takeups, drive units, safety devices and sprockets, and carrier and guards. Four sections treat specific types of Monoveyors while a final section is devoted to other products. Book is printed in full color with many pictures, charts and diagrams. For your copy write on business letterhead to *Mechanical Handling Systems, Inc., 4600 Nancy Ave., Detroit 12, Mich.*

Reference chart for 7 protective coatings

A phosphating reference chart describes the purpose and composition of seven types of protective coatings, recommends uses, gives applicable government specifications, methods of application, equipment requirements, lists metals that can be coated, coating weights, and gives basic operational cycles. The chart is contained in a folder that also includes a brief general discussion of phosphating with diagrammatical cross sections of how phosphating works, application photographs and a discussion of the use of coating materials as bonds for paint and other organic finishes, as anti-friction coatings, and as agents to protect unfinished metals from corrosion. *Turco Products, Inc.*

... for your copy, circle No. 176

Conveyor pulleys for varied industrial use

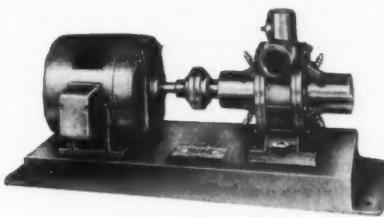
This 12-page specification and price booklet covers conveyor pulleys for original installation or replacement on package, production line, portable and general conveyor systems. Engineering drawings, illustrations and descriptive matter are also included for all products. The booklet covers three types of solid steel conveyor pulleys, lagged pulleys, and a split steel pulley. (Booklet CP-80) *R. & J. Dick Co., Inc.*

... for your copy, circle No. 177

Tygon plastic tubing for fluid transmission

A 28-page book, called "Tygon Flexible Plastic Tubing for Better and Safer Fluid Transmission," discusses all the properties of the thermoplastic that make it suitable for tubing and shows many applications pictures. Types of tubing covered include braided, extruded and vacuum. Instructions are given for coupling, cleaning, using in laboratories, packaging and other uses. *United States Stoneware Co.* ... for your copy, circle No. 178

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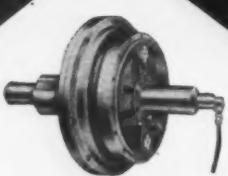
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... for more details, circle No. 55

Guide to packaging and carloading operations

This is the seventeenth edition of this packaging and carloading guide which tells how to package and carload for maximum product protection at minimum cost. The 48-page pocket sized book covers a complete line of strapping, seals, strapping tools, grain doors, retaining strips, and other packaging and loading materials, and gives complete instructions for application of the materials. Well illustrated with product and application photographs. *Sig-node Steel Strapping Co.*

... for your copy, circle No. 179

Portable purifying unit for industrial solvents

A portable purifying unit for industrial oils and solvents in machines, reservoirs, tanks or barrels is detailed in a four-page leaflet which lists advantages of the portable unit and gives "before" and "after" pictures. Specifications are given in chart form for three models. A separate single page leaflet covers the stationary purifying unit. *Mayhew Products Co.*

... for your copy, circle No. 180

Three detailed data books on blower equipment

The first of these three books on Buffalo's Type BLH fans pictures the units, discusses inlet vanes and gives performance data for them, and covers thoroughly selection and rating as well as general information. (Booklet F-200). The other two booklets give similar information for the Type CR fan (FD205) and four series of Airfoil fans (FD106). *Buffalo Forge Co.* ... for your copy, circle No. 181

Application guide book on wheel, roller conveyors

The roller type and the wheel type of gravity conveyor are both detailed in this eight-page booklet, which is divided into three sections. The first section on the wheel type gives construction features of two different models, complete specifications, information on available accessories and installation photographs for both models. The second section gives similar treatment to the roller type of gravity conveyor. The final section covers the curves and accessories available for setting up a conveying system made up of either of these two types. *A. B. Farquhar Div., Oliver Corp.* ... for your copy, circle No. 182

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... for more details, circle No. 56 on Reader Service Postcard

WESTERN INDUSTRY — December 1956

Chemical resistant coatings for protection of metals

Three general classes of chemical resistant organic coatings for protecting metals are treated in this four-page brochure: Ucilon coating systems applied like paint for general corrosion control, Unichrome plastisol compounds for heavy duty service, and Unichrome special materials for lining steel drums and tanks. Physical advantages and techniques of application are included. (Bulletin Chem C-2) **Metal & Thermit Corp.**

... for your copy, circle No. 183

52-page engineering manual on metallurgy products

A new edition of Amplex's engineering manual contains 52 pages of information on self lubricating bearings, finished machine parts and permanent metal filters. Data on all properties of Oilite materials is included as well as Brinell and Rockwell ratings for Oilite materials. Industrial applications of these materials are included. A special 12-page insert lists over 1,000 standard sleeve, flange and thrust bearings, cored, solid bar and plate stock. (Manual E-56) **Amplex Division, Chrysler Corp.**

... for your copy, circle No. 184

4-way valve for air, oil service

A direct solenoid operated four-way valve for air or oil service is the subject of this eight-page pamphlet, which opens with a list of the unit's special features, among them the fact that it can be converted from single solenoid to double or momentary version. Flow diagrams, valve combinations and JIC symbols are given for single solenoid with two-position spring return, double solenoid with two-position momentary, and double solenoid with three position. Dimensional data completes the booklet. **Ross Operating Valve Co.**

... for your copy, circle No. 185

Barrel-finishing with Norton Tumblex abrasives

This 76-page handbook gives information on types of barrels, selection of abrasives, cleaners, time cycles and other pertinent data about barrel-finishing. The booklet includes before and after photographs and case histories of deburring, finishing for plating, and precision forming of radii to blueprint specifications. The pocket sized book has a table of contents and many illustrations. (Form 501) **Norton Co.** ... for your copy, circle No. 186

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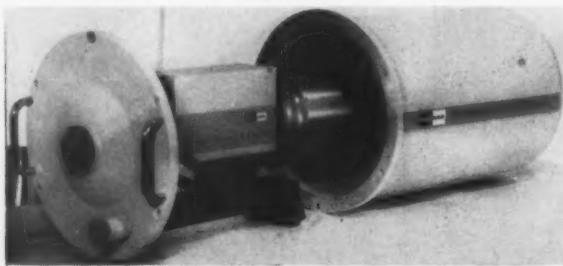
NEW EQUIPMENT

for Western plant operation,
production, and maintenance

USE RIP-OUT POST CARD, page 69, for more information on products described.

TV CAMERA AND HOUSING

... designed for high noise environments



A ruggedized camera and new acoustical housing have been designed for operation under high ambient noise conditions, such as in rocket and jet engine test facilities, launching sites and other places where noise conditions prohibit the use of ordinary equipment. The ruggedized camera is of the same weight and dimensions as a regular industrial television camera but has been re-designed internally. The acoustical housing provides about 45 db. of isolation and will accept the camera accessories. A heavy duty pan-tilt unit is also available for the acoustical housing. *Kay Lab.*

... for more details, circle No. 187 on postcard

VINYL COATING

... resists acids, alkalies, water

A vinyl maintenance coating called Ucilon Coating 1400 resists acids, alkalies, water and other causes of early paint failure but does not require the meticulous surface preparation that earlier vinyl-based coatings did. The coating may be used for walls, floors, and exteriors of equipment to resist corrosive fumes in industrial atmospheres. The coating is self-priming and brushes on like oil paint. It can be applied over bare metal, wood, masonry and most previously painted surfaces without special surface preparation. *Metal & Thermit Corp.*

... for more details, circle No. 188 on postcard

PORTABLE X-RAY

... penetrates 1 1/4-in. steel



A 130-kv. portable X-ray with a tube head weighing only 50 lb. will penetrate up to 1 1/4-in. steel. The tube head, measuring 7 1/2 x 18 in., operates on a lightweight

control unit of its own or on a standard Andrex 160-kv. control. This unit is particularly suitable for spot X-raying welds on storage tanks, pipe lines or other structures. *Holger Andreasen, Inc.*

... for more details, circle No. 189 on postcard

LINE OF FURNACES

... designed for pilot plant operations

A line of furnaces has been designed especially for pilot plant operations requiring testing and determining of proper methods and processes for heat treating and melting of metals. There are six units in the line: an atmosphere box furnace for continuous operation at 2,600 deg. F., a box furnace with reactor control, high frequency induction furnace, horizontal tube furnace, vertical tube furnace, and high temperature pot furnace for operation at 2,500 deg. F. *Lindberg Engineering Co.*

... for more details, circle No. 190 on postcard

MODIFIED LEAK DETECTOR

... for automatic high production leak testing



Automatic high-production leak testing at low cost is possible with G. E.'s modified leak detector, which has a fixed head for attachment to the conveyor belt or mass-produced products replacing the hand-held gun of the standard model. The fixed head houses the sensitive element while an aspirator pump mounted near the fixed head provides the air-sample flow through the element. Leak defects are indicated visually and/or audibly. *General Electric Co.*

... for more details, circle No. 191 on postcard

CORROSION-RESISTANT GREASES

... protect against 100 corrosive agents

The Keystone 5P line of acid and alkali-resistant greases gives protection against more than 100 corrosive agents and solvents. The greases prevent leakage, preserve packings, protect equipment and floors and help to lower operating and maintenance costs. Three types of grease are in the line. All have a smooth non-fibrous body, are pale amber to light cream in color and come in four consistencies: heavy, medium, light and extra-light. Can sizes range from 1 to 400 lb. *Keystone Lubricating Co.*

... for more details, circle No. 192 on postcard

PORTABLE BELT CONVEYOR ... expands into vehicle at dock



A line of heavy duty portable belt conveyors expands up to 17 ft. into vehicles from loading docks to perform loading and unloading operations. Larger of the two conveyors in the line has a distributed load capacity of 4,000 lb. with a minimum length of 26 ft. expandable to 43 ft. The 16-in. belt moves at a speed of 78 ft. a minute and is powered by a 2-hp. motor. Total weight of the large unit is 5,200 lb. The small unit weighing 1,515 lb. has a total distributed weight capacity of 1,000 lb. and is 15 ft. long, expandable to 25 ft. It has a 16-in. belt which moves at a speed of 75 ft. a minute powered by a 1-hp. motor. *Colson Corp.*

... for more details, circle No. 193 on postcard

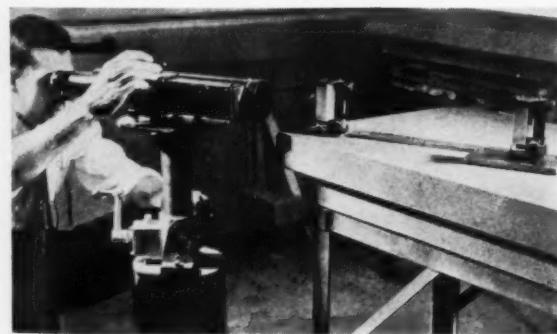
CONTROL SYSTEM

... converts pneumatic signals to d-c.

Mechanical and pneumatic signals can be converted to direct current for long range transmission and then reconverted to pneumatic pressure for actuating control valves or other pneumatic equipment with this electro-mechanical control system. The system permits low cost remote measurement, indication, recording and controlling of process variables by the elimination of electronics and complex circuitry. The electro-mechanical device, called the P-E-P transmission system, utilizes the advantages of both electrical and pneumatic control systems. The transmitter unit uses a flexure-mounted beam and pneumatic nozzle as an error detector and power amplifier to convert a pneumatic signal to an electrical signal. A receiver re-converts the d-c. signal. *Fielden Instrument Division, Robertshaw-Fulton Controls Co.*

... for more details, circle No. 194 on postcard

OPTICAL CALIBRATION ... of granite surface plates



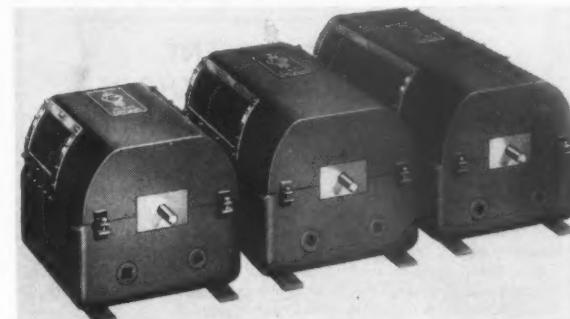
A new service, the optical calibration of granite surface plates, is being offered for the benefit of smaller Western plants that are called upon to furnish certification on their plates but do not have the techniques necessary to produce the required information. The certificate of inspection that is issued refers to accuracy grades described in the Federal Specification for granite surface plates, and the firm has been inspected for its service by the three branches of the military service. The service involves operating an auto-

collimator which reads the relationship between reflections from a stationary mirror to the left of one end of a reference line and from a second mirror to the right of the line, which steps off the line in increments of its own baseline. Readings are taken on the plate as it exists in the user's work environment. Pictured above is a typical autocollimator setup. *Agnew-Higgins, Inc.*

... for more details, circle No. 195 on postcard

CAM LIMIT SWITCH

... with external in-motion adjustment



A cam-operated rotating limit switch designed to facilitate precise synchronization of multiple operations has a positive micrometer screw adjustment of each individual contact assembly in relation to its cam. Adjustment can be made with a screwdriver from the outside while the switch is in motion. The limit switch is available in three sizes accommodating up to 5, 9 or 12 cams. Split butterfly cams can be set with a spread between make and break of from 15 to 345 deg., and the outside in-motion adjustment of plus or minus 15 deg. makes possible precise final synchronization while equipment is in operation. Switch is designed to operate at speeds up to 100 rpm., and rotation can be either clockwise or counter-clockwise. *Clark Controller Co.*

... for more details, circle No. 196 on postcard

ONE-MAN CARLOADER

... for trucks, trailers, box cars



This one-man push-button carloader for trucks, trailers and box cars has a stacker car that swings manually 180 deg. from the end of the conveyor and raises, lowers, moves forward or backward at a touch of the controls. The stacker boom on the carloader has a belt 18 in. wide which comes in two lengths: 6 ft. and 8 ft. The boom can be raised to a height of 84 in. and lowered to 18 in. from the floor. Speed can be set to handle twenty 100-lb. bags a minute. The loader is made up of four parts—stacker car, belt drive car, power traveler car and center cars. *R. T. Sheehan Co.*

... for more details, circle No. 197 on postcard

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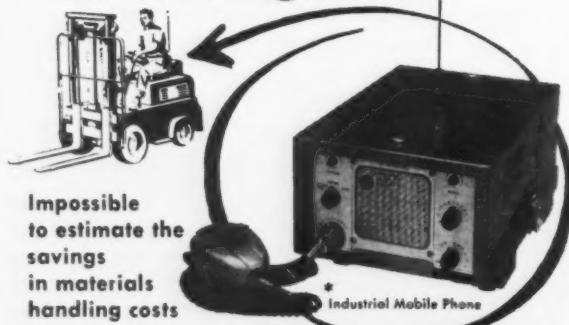


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... for more details, circle No. 58 on Reader Service Postcard

... what the Kaar IMP* did for Westinghouse?



Only in operation at Westinghouse's Sunnyvale, California facility for two months, the IMP radiotelephone communication system has already made history at this plant. Easily installed and immediately adaptable, the IMP system went to work for Westinghouse within hours after delivery.

By keeping trucks, cranes, fork lifts, and switch engines under the constant control of the materials handling supervisor, the IMP has eliminated useless backtracking and empty loads. Machine efficiency has jumped, traffic moves faster, and every trip means a payload. The savings in time—materials—personnel—are impossible to estimate. Call your local Kaar dealer or write for information, and you will learn why Westinghouse is so enthusiastic over the IMP. It will pay you big dividends.



ENGINEERING CORP.

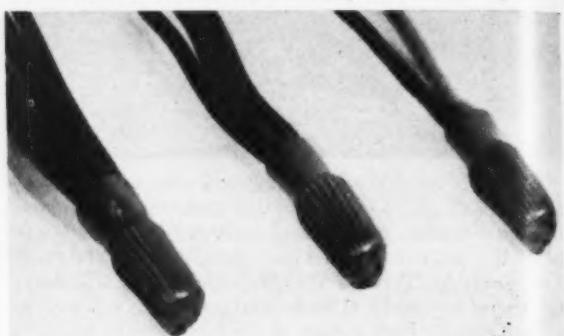
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PALO ALTO, CALIFORNIA

... for more details, circle No. 59 on Reader Service Postcard

60

ONE-STEP WIRE CONNECTOR

... makes solderless, ready-insulated splices



In one step without tools this spring type electrical wire connector makes solderless, ready-insulated splices. Called the Scotchlok, it provides a vibration resisting pig tail splice that holds regardless of thermal or mechanical changes, according to the manufacturer. The connector meets all requirements for high and low voltage building and fixture wiring, and consists of a cone-shaped coil spring within a steel shell to prevent crushing in crowded junction boxes. The vinyl insulating jacket molded over the unit features a triangular cross-section for a better finger grip during application. It also includes a skirt at the bottom to protect the wires and prevent flashover. Minnesota Mining & Manufacturing Co.

... for more details, circle No. 198 on postcard

HANDY TRAVEL DESK

... keeps note pad out of way but ready to use

Designed particularly for mobile use, this clip-type "desk" firmly holds a pad of note paper, order blanks, etc. Equipped with a swivel joint, the Travel desk can be swung back out of the way or under the dash board when not in use. Installation requires no drilling. Four leveling screws in the clamp device make it an easy matter to level the desk up in spite of the angle of its attachment. The low-cost unit, which is equipped with a magnetic mechanical pencil, should be particularly useful in mobile maintenance units, order picking trucks in warehouses, lift truck operations, in-plant messenger vehicles, etc. General Industrial Co.

... for more details, circle No. 199 on postcard

DOUBLE UNIVERSAL JOINTS

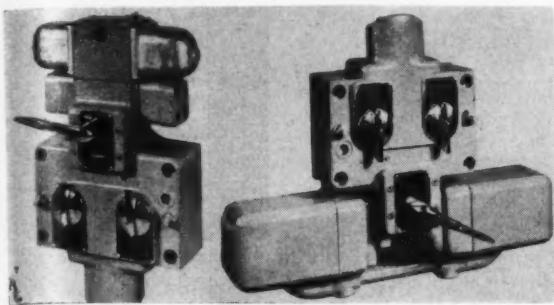
... for slow speed applications to 300 rpm.



This series of double universal joints was designed for slow speed applications up to 300 rpm., with thirteen standard sizes providing a horsepower range from $\frac{1}{2}$ to 207 at 100 rpm., and static torque from 340 to 130,700 in./lb. Maximum operating angle is 90 deg. Joints are available solid or bored with hub diameters from $\frac{1}{2}$ to 4 in. Standard lengths run from 4 to 21 $\frac{1}{4}$ in., although sizes can be furnished to fit individual requirements. Alloy steel forks are concentric to .001 in. while pins are ground to .0005 tolerances. Lovejoy Flexible Coupling Co.

... for more details, circle No. 200 on postcard

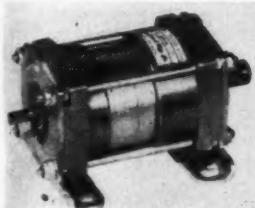
TRAVERSE, FEED PANELS
... control oil-hydraulic systems



Three new series of sub-plate mounted traverse and feed panels are available for control of industrial oil-hydraulic systems. Suitable for a wide variety of machine tool and production equipment, the panels feature improved valve sections for direction and feed control. Many models are available in each series and are designed for use with $\frac{3}{4}$ -in. nominal pipe size. Conventional or differential cylinder traverse action models are both available. The flow control valve section in the panels includes two locking type dials which permit independent selection of both fine and coarse feed rates. *Vickers, Inc.*

... for more details, circle No. 201 on postcard

PLANETARY GEAR BOX
... good for intermittent service use



A small planetary gear box has been developed for use where service is intermittent. Available in ratios from $4\frac{1}{7}$ to 40,188, the reducer has an output torque varying from 100 at low ratio to 250 in. lb. at higher ratios. Unit has leg

or flange mounting. *Arizona Gear & Manufacturing Co.*

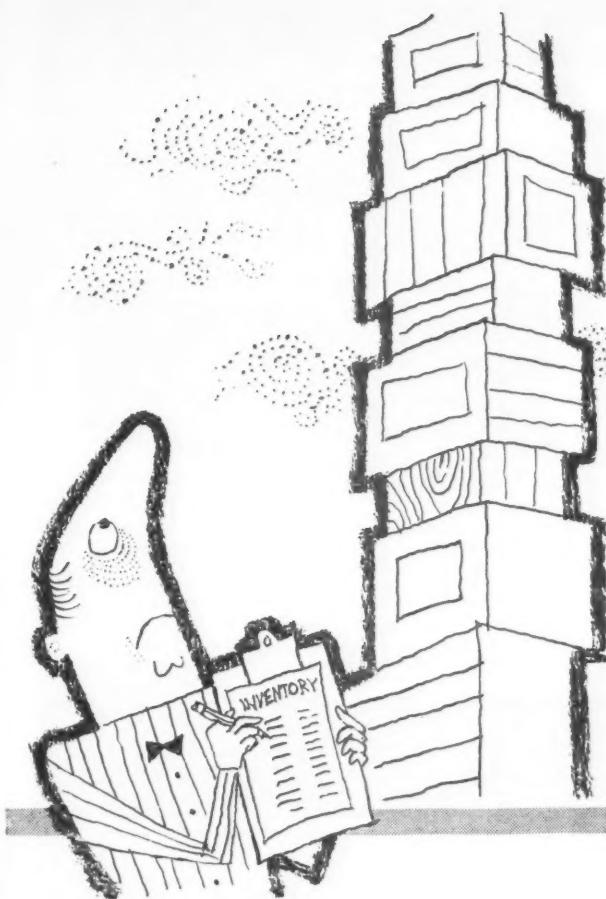
... for more details, circle No. 202 on postcard

AUTOMATIC DOCKBOARD
... with positive safety stop



A positive safety stop, which prevents free falling if a truck should pull away leaving the lip unsupported, is a special feature of this redesigned and simplified Hi-Lo automatic dockboard. The truck-actuated, counter-balanced ramp also has a redesigned and improved cross traffic lock which supports it in dock level position. Two adjustable arms which pivot on the front cross beam assure smooth operation of the dockboard. *Kelley Co., Inc.*

... for more details, circle No. 203 on postcard



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applies to inventories as well as prices . . . especially when supply lines are slow or unreliable.

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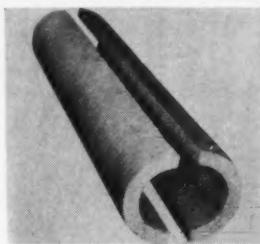
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... for more details, circle No. 62 on Reader Service Postcard

MOLDED INSULATION

... for use with wide temperature range



A molded insulation designed for use with a wide range of temperatures on steam and heated process piping will withstand pipe temperatures up to 1,350 deg. F. The low conductivity insulation is produced in half cylindrical sections and segments 36 in. long. It can be cut and worked with ordinary tools and requires only simple encircling metal bands to fasten two mating sections to a pipe. Thicknesses of the insulation range from 1 to 4 in. This Kaytherm pipe insulation is made by reacting lime and diatomaceous earth under suitable conditions of heat and water to form a hydrous calcium silicate, which is bonded together with asbestos fibers. The material is flame-resistant, chemically inert and insoluble in water. Keasbey & Mattison Co.

... for more details, circle No. 204 on postcard

FIELD COIL

... protects against atmospheric contaminants



This integrated field coil has a new insulating system designed to protect electric motors and generators against atmospheric contaminants and destructive mechanical forces. The field coil is particularly suited for applications requiring chemical resistance, or sealing against oil, moisture and atmospheric contaminants. It is currently available for synchronous and d-c. machines subject to severe duty cycling in Class A and B temperature classifications. Primary insulation in the integrated field coil is glass with fibers tailored and oriented for great strength. Inorganic, heat stable resins augment the glass fibers. Cutaway photograph at left shows bonding of integrated field coil and locking at rotor pole surfaces. Allis-Chalmers Manufacturing Co.

... for more details, circle No. 205 on postcard

POWER SWEEPER

... with dust control equipment

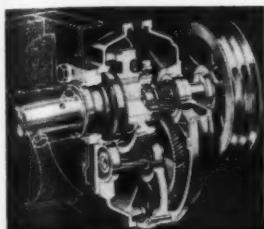


Special dust control equipment on this power sweeper prevents debris from collecting and hampering the efficiency of the unit. A dust control blower is mounted directly to the motor, eliminating belts and bearings which are subject to wear. The sweeper comes in two models, the MHD-36 and MHD-48. The model numbers indicate the swath in inches of the main brushes. A special side brush for cleaning along walls adds an additional 11 in. to each model's cleaning swath. The MHD-36 covers 80,000 sq. ft. in an hour, while the other unit will cover more than 100,000 sq. ft. in the same time. Modern Power Sweeper Co.

... for more details, circle No. 206 on postcard

SPEED-REDUCTION UNIT

... for screw conveyor applications



A speed-reduction unit especially designed for screw conveyor applications, called the Screw-King drive, has a flange adaptor that permits bolting directly to the trough end of a screw conveyor. Output shaft fits into the end of the pipe of a standard 6, 9, or 12-in.

screw having a bore of 1½, 2, or 2 7/16 in. Input shaft is driven from a motor by a short center V-belt drive. Trough ends, punched with holes to match the bolt holes in Screw-King adaptor plates and screw conveyor troughs, are also furnished. *American Pulley Co.*

... for more details, circle No. 207 on postcard

ELECTRO-MAGNETIC PLATE LAMP

... for positioning, holding welding work



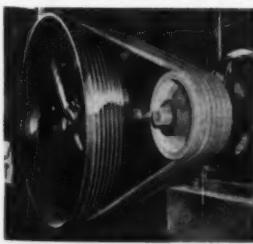
A portable electro-magnetic plate clamp for positioning and holding work for welding weighs only 78 lb. and stands just 10 in. high. The compact unit has a reduced rectifier element which has permitted cutting the housing unit nearly in half. Special features include direct lift off up to

6,500 lb. and a reverse polarity switch for quick release of magnetic pull. *Buck Manufacturing Co.*

... for more details, circle No. 208 on postcard

HIGH CAPACITY V-BELT

... for increasing power transmission



Designed for applications where increased power transmission is desired with a minimum of maintenance of multi-V-belt installations, the Powerflex Hi-Capacity V-belt is available in all standard sizes and has an oil resistant cover to prolong belt life. According to

the manufacturer, lower drive costs can be achieved since fewer belts and narrower sheaves are required to handle a load. The belt is available with static conducting covers. *Thermoid Co.*

... for more details, circle No. 209 on postcard

FLOOR MACHINE

... with brushes for every application



These heavy duty floor machines have brush sizes of 14, 16, and 18 in. to suit every application. The Tornado Series 90, as the new line is called, is powered with a heavy duty capacitor start motor that drives a planetary system of steel helical gears at a 10 to 1

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cold feet with
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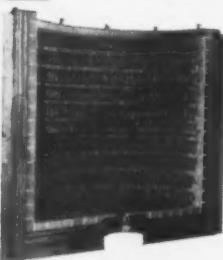


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- All-Welded Internal Connections
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- Maximum Element and Jacket Life — Minimum Maintenance

Let an experienced Trent Heating Engineer show you how Trent "High-Temperature" Jackets with Trent "Folded-and-Formed" Heating Units can mean trouble-free controlled heat for the kettles, tanks, autoclaves and similar process vessels you use or design. Or write for Bulletin 72-E.

Trent Representatives In
Principal Cities
Coast to Coast



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man
putting
down
a
sound
investment!



This company has made a wise investment—one which will pay many dividends over a long period of time! The man above is dropping a Magliner magnesium dock board in place on the company's dock. This new Magliner will speed loading . . . get more out of power trucks and other loading equipment . . . keep costs down! Made of light, strong magnesium, it will protect men, loads and equipment against accidents and costly damage. It will also pay other big dividends! Magliners are low in initial cost—and because they provide dependable, long-life service with less maintenance they give you greater economy ALL ways! Find out today, how Magliner dock boards can cut costs in your operation. Write for Bulletin DB-204!



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Winn Supply Company 256 7th Avenue, P. O. Box 1709 San Diego 12, California
for more details, circle No. 66 on Reader Service Postcard

reduction ratio. The brush, operating at 172 rpm., starts easily under heavy loads for scrubbing, stripping, polishing, steel wooling, sanding and terrazzo grinding. The brush coupler mounts directly on the gear drive. The line features dual switch controls at the handle, under-handle cable connection and self-retracting, non-marking neoprene wheels. *Breuer Electric Manufacturing Co.*

... for more details, circle No. 210 on postcard

6,000-LB. ELECTRIC FORK

. . . for loading closed trucks, trailers

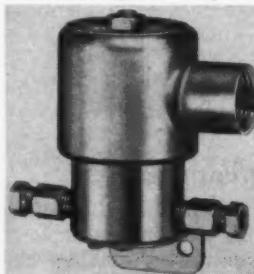


Designed for loading closed highway trucks and trailers, this low-silhouette 6,000-lb. electric fork truck needs only 6 ft. of clearance, yet the operator's seat is 38 in. below the top of the mast. Thus the head of the operator is always below the top of the mast and he cannot be hit by low overhang. The truck has three braking systems: service brakes are hydraulic, self-energizing and self-equalizing, while the parking brake is actuated by the spring seat. Dynamic braking prevents abrupt reversal of direction while the truck is in motion. *Baker-Raulang Co.*

... for more details, circle No. 211 on postcard

ELECTRIC SCREWDRIVER

. . . with power speed control

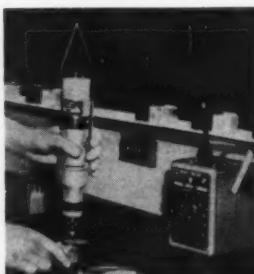


The power speed control added to this electric screwdriver provides a means of controlling both the power and the speed of the unit. With the control an infinite number of instantaneous adjustments are possible to drive screws smaller than those for which the tool was designed. A dial is used to set the control and it is always possible for the operator to re-set the dial in the same position and drive any number of different screws with the same power and speed. *Black & Decker Manufacturing Co.*

... for more details, circle No. 212 on postcard

ELECTRO-PNEUMATIC VALVE

. . . doesn't talk, hum, or chatter



This electrically operated air valve, which doesn't talk, hum, or chatter, owes its quiet operation to a closely held spring, armature, guide, and material tolerances, which prevent alternating current hum and other noises. The electro-pneumatic valve may be used for noiseless control of air conditioning damper motors, and control of pneumatic motors, and valves on industrial equipment. When electrically energized the valve will pass full air at supply pressures up to 25 lb. *Powers Regulator Co.*

... for more details, circle No. 213 on postcard

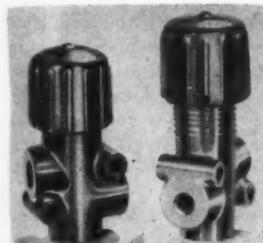
12-OZ. GREASE CARTRIDGE ... for loading automotive-type grease guns



Designed for quicker, simpler and cleaner loading of grease guns, this cartridge for RPM automotive grease will hold 12 oz. The Saran enclosed grease sausage has metal grommet closures at both ends. When loading, the contents of the package can be stripped directly into the gun barrel or the entire sausage may be inserted in the gun. With the latter system the top of the cartridge is punctured or cut off, the head of the gun is replaced, and the unit is ready for lubing. Available in cases of 24 cartridges to automotive equipment operators. Standard Oil Co. of California.

... for more details, circle No. 214 on postcard

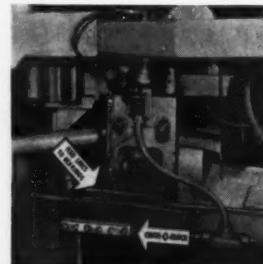
RIGID PVC VALVES ... for high temperature, pressure use



A new series of general purpose rigid PVC valves has been designed for use under high temperature and pressure conditions usually considered too severe for ordinary plastic materials. These valves operate under pressures up to 170 psi., are continuous-duty, and in lower pressure systems may be used at temperatures up to 170 deg. F., or higher for intermittent duty. Valves are available in $\frac{1}{8}$ and $\frac{1}{4}$ -in. pipe sizes and $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$ -in. O.D. male tube connections. Chemtrol Corp.

... for more details, circle No. 215 on postcard

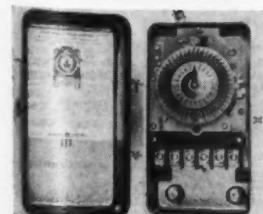
LUBRICATION SYSTEM ... centralizes all grease fittings



This centralized lubrication system consists of one or more manifold blocks, threaded for insertion of standard hydraulic grease fittings, which are bolted to the most easily accessible location on a machine. Rigid or flexible feed lines connect bearings to inlet ports of the manifold blocks. Fittings can be contacted by any standard manually or power-operated application device, such as lever gun, bucket pump, or power lubricator. Lincoln Eng. Co.

... for more details, circle No. 216 on postcard

TIME SWITCH ... with multi-tripper dial



This general purpose time switch has a multi-tripper dial for flexibility of time setting. Called the Model TSA-555, the unit may be used where many varied on-off schedules are required during a 24-hr. period. Typical applications are heat-

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Oakite Rustripper is an alkaline material that strips paint, pigment residues, phosphate coatings and undercoat rust in one operation. Ask for booklet "Here's the best shortcut in the field of organic finishing".

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Oakite Rustripper removes rust, heat scale and oil from steel in one operation. Avoids hydrogen embrittlement and other disadvantages of acid pickling. Ask for booklet "Here's the best shortcut in the field of electroplating".

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ing, air conditioning, and operation of automatic machines. Trippers are permanently fixed on the timer dial and cannot be accidentally dislodged, but may be removed and relocated easily with a screw driver. Slots are placed at each $\frac{1}{4}$ -hr. point on the dial, permitting maximum flexibility of timing schedules. Minimum "on" time can be 15 min.; minimum on-off cycle is 45 min. *General Electric Co.*

... for more details, circle No. 217 on postcard

ELECTRIC SWEEPER

... can cover 70,000-sq. ft. area each hour



A built-in battery charger takes care of recharging when plugged into any 110-v. outlet. Sweeper has three-speed forward transmission and one-speed reverse. *Wayne Manufacturing Co.*

... for more details, circle No. 218 on postcard

OPTICAL GUIDANCE SYSTEM

... added to operatorless industrial tractor

An optical guidance system is available for the Guide-O-Matic electronic industrial tractor that requires no opera-



Better moisture resistance in rubber power cable!

Anaconda's Type AB butyl high-voltage insulation absorbs far less moisture than industry standards permit. Result: longer cable life, greater freedom from failure for users where rubber-type cable is installed in underground ducts or buried directly in earth. New Engineering Bulletin EB-27 gives full details on performance of Anaconda Type AB insulation in 15 Industry Specification Tests. Write for your free copy. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

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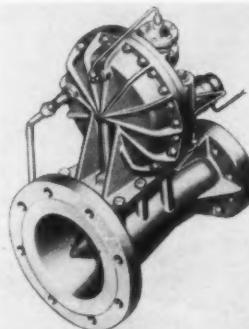
... for more details, circle No. 69 on Reader Service Postcard

tor. In place of the guide wire that was previously imbedded in the floor or anchored to the floor under a tape, the optical guidance system uses a painted line or a white tape on the floor to transmit guidance to the tractor. Any white paint may be used for the purpose. Light coming from a small bulb in the sniffer box reflects from the tape or paint on the floor and actuates photo electric cells in the sniffer box. *Barrett-Cravens Co.*

... for more details, circle No. 219 on postcard

REGULATOR AND VALVE

... for operation on pneumatic facilities



A pneumatic pressure regulator and shutoff valve, operating with a closing time of $1/10$ of a second, has been designed for operation on pneumatic facilities such as those used in rocket, ram jet and turbine engine test installations where the source gas is stored under high pressure. Function of the regulator is to reduce high pressure gas at 3,000-psi. inlet pres-

sure. At the same time it acts as a zero leakage shutoff valve. The basic valve may be used as a reducing and shutoff valve for any high pressure industrial gas system, such as flowing nitrogen or natural gas. *AiResearch Industrial Division, Garrett Corp.*

... for more details, circle No. 220 on postcard

VINYL STRAPPING TAPE

... with 250-lb. tensile strength



A glass reinforced strapping tape with a vinyl plastic backing has a tensile strength of 250 lb. The pressure sensitive tape is suited for packaging, package reinforcing, bundling, palletizing, unitizing, tear stripping. The tape resists abrasion, salt water, acids, alkalies and is rust, mildew, water, oil and grease proof. Its holding power of 68 to

72 lb. per sq. in. assures the user positive adhesion. The tape is flexible so it conforms to irregular surfaces and is easy to apply by hand or with machine. *Dutch Brand Division, Johns-Manville.*

... for more details, circle No. 221 on postcard

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THE INDUSTRIAL WEST ON ITS WAY

plants • production • distribution • personnel

GUIDELINES

- **FOOD PROCESSING PLANTS SPARK WESTERN NEWS THIS MONTH:** Heading up the list of multi-million dollar new plant announcements is the world's first production-size atomic food processing plant to be under construction by July 1957 at Sharpe General Depot in Lathrop, Calif. Plant will cost \$7,500,000.
And Southern California will have its first coffee processing facility when J. A. Folger & Co. completes its \$900,000 plant near Long Beach.
\$1,500,000 will go into Heublein, Inc.'s food processing and liquor distribution plant in Menlo Park, Calif. Employment in the 100,000-sq. ft. plant will be about 100 persons.
Largest pea processing plant in the world will be Inland Empire Pea Growers Assoc. \$1,100,000 Spokane, Wash., facility. Construction completion is scheduled for this month.
- **TWO AIRCRAFT FIRMS FOR THREE MAJOR EXPANSION MOVES:** Boeing has optioned to buy Ford's old 60-acre assembly plant in Richmond, Calif. This is another "possible" for the home of its guided missile operation. Unofficial reports point to many other and larger possibilities. Watch for big news in this direction.
And at its Seattle, Wash., home, Boeing plans to lease a now-under-construction \$5,000,000 plant from Parr Industrial Corp. for the housing of a jet parts production operation.
Hughes Aircraft Co. plans to build a \$1,250,000 engineering facility to employ 500 persons in Tucson, Ariz. Due for completion November 1957, the building will be center of engineering work on Hughes' Falcon air-to-air guided missile, now headquartered in Culver City, Calif.
- **TYPICAL OF THE WEST'S EVER CHANGING PICTURE** are three major announcements by General Electric: **Headquarters for its computer department will be established in Phoenix, Ariz.** Present temporary headquarters are in Syracuse, N. Y., and the department has a lab set-up in Menlo Park, Calif. Key personnel will begin move **early in 1957**. First GE department to headquartered in the West was its atomic products equipment unit in San Jose, Calif. Also announced were a **40% increase in staff and a doubling of size** planned for GE's microwave lab at Stanford Industrial Park in California and the leasing of a 15,000-sq. ft. building in Los Angeles to house warehousing and sales operations of GE's protective devices division.
- **KEEPING UP WITH ATOMIC ENERGY DEVELOPMENTS IN THE WEST** is almost impossible, but here are the five latest major announcements:
Lockheed's Missile Systems Div. in Palo Alto, Calif., is scheduled to be the home of a pilot model **nuclear reactor**. Plans for the reactor's use have been tagged as "classified information."
A multi-million dollar contract went to Vitro Uranium Co. in Salt Lake City, Utah, for further production of uranium concentrates. New AEC contract calls for a maximum \$1,200,000 production facilities expansion.
Wyoming will be the site of another uranium processing mill. AEC let a contract to the Lucky Mc Uranium Corp. of Salt Lake City, Utah, for construction and operation of a \$7,000,000 mill in the Gas Hills near Riverton, Wyo. Ores processed will be from Lucky Mc properties and independent producers in the area.
Plans for a uranium processing mill in Maybell, Colo., jumped from the "proposed" stage upon signing of a contract by the AEC and Trace Elements Corp. for the purchase of ores to be produced at the mill.
Another Colorado site will be the scene of uranium mill construction soon as a result of the AEC-Gunnison Mining Co. signing of a contract for the purchase of ores to be produced.

— News details on following pages —

THE INDUSTRIAL WEST
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NEWLY-OPENED HEADQUARTERS at Oakland feature the service shop and extensive parts department of Lifton, Inc., dealers for Clark fork lift and Ross Carrier. The new building covers 26,000 sq. ft.

Lifton opens new Oakland headquarters

Lifton, Inc., Clark fork lift and Ross Carrier dealers in Northern California, officially opened house at its new \$200,000 headquarters at 6601 San Leandro St., Oakland, Calif., recently. The new building covers 26,000 sq. ft. of space and features an extensive parts department and service shop.

Recently purchased by this firm was the Glen L. Codman Co., dealers representing Clark Equipment Co. in Northern California for the past 16 years. Heading up Lifton as president is *William G. Codman*. Other lines handled

by the firm, all of which are materials handling equipment, include Roura hoppers, Greer palletizers, Portapal pallet trucks, Penco dock ramps and Ace pallet rollers.

Services provided by this sales and rental dealer include mobile service stations designed to call on industrial plants in the San Francisco Bay area.

Other officials of the firm are *Edward G. Hartsinck*, vice president and sales manager, *C. W. Dinsley*, treasurer, and *Frank J. Schurr*, vice president and sales engineer.

5 major AEC moves slated for West

Five Western companies from four Western states are figuring in the latest plans of the Atomic Energy Commission. Four of AEC's recent contracts deal with uranium directly, while the fifth calls for a pilot model nuclear reactor.

AEC has signed agreements with Trace Elements Corp. and Gunnison Mining Co., both of Colorado, for the purchase of uranium concentrates produced by Trace's new plant, scheduled for completion at Grand Junction in about a year, and Gunnison's processing mill to be erected near Gunnison, Colo. Both plants will process ores from the area.

A contract for the construction and operation of a \$7,000,000 uranium processing mill near Riverton, Wyo., was signed with the Lucky Mc Uranium Co. The plant will be one of the largest of its type in the country and should be in operation by the end of 1957.

Vitro Uranium Co. in Salt Lake City has also signed a multi-million dollar contract for production of uranium concentrates. Vitro will spend \$1,200,000 to expand its production facilities in the area and to install a new process of recovering uranium

concentrates from ore.

The pilot model nuclear reactor to be erected by AEC is scheduled for the Lockheed Aircraft Corp. Missile Systems Division's plant in Palo Alto, Calif., and is designed to pave the way for development of a full size reactor.

Heublein plans \$1,500,000 food processing plant

Heublein, Inc., has announced plans to build a \$1,500,000 food processing plant and liquor distribution center in Menlo Park, Calif. Construction of the facility, which will serve the 11 Western states, will start this month. Plant will employ about 100 people in a 100,000-sq. ft. space.

Kaar Engineering plans personnel, plant expansion

Immediate expansion of personnel, plus enlarged plant facilities, is anticipated by the Kaar Engineering Corp., of Palo Alto. Recently awarded a Civil Aeronautics Administration contract for about \$500,000 for radio transmitters, the firm also has orders for radio telephone equipment for the U. S. Treasury Department and the Navy.

Stockton gets world's first atomic food plant

First production-size atomic food processing plant in the world will be constructed near Stockton, Calif., at Lathrop. Announced by the Department of the Army, pilot plant is being built at a cost of \$7,500,000 to determine the economic feasibility of preserving food by the ionization process of blasting it with high-energy radiation.

Construction will be started by July 1, 1957, with operation of the plant expected to begin by October of 1958. A peak monthly capacity of 1,000 tons of food for use of combat troops is anticipated. The type of radiation used is non-injurious to health, Army officials emphasized, and there is no danger from wind-blown wastes.

The Atomic Energy Commission will design and build the special reactor and ancillary reactor equipment at an estimated cost of \$3,000,000. The non-reactor portion of the pilot plant will be built by the Army for about \$4,540,000.

GE moves computer unit to Phoenix

Second move of a General Electric Co. major department to Western headquarters will take place with the establishment of the firm's computer department at Phoenix, Ariz. In September its atomic products equipment unit set up national headquarters in San Jose, Calif.

The move initially will involve housing of administrative, engineering and research facilities in leased space beginning this month. The unit already has a laboratory, devoted entirely to development of the ERMA data system for the Bank of America, at Menlo Park, Calif.

Temporary headquarters for the computer department, but with no large scale operations, has been at Syracuse, N. Y. Key personnel will move from that city to Phoenix early in 1957, and additional engineers and technical personnel will be recruited from the West. A line of computers designed for business and industrial use, as well as for military applications, will be developed and produced at the Phoenix facility.

Bowser opens new L.A. supply division

Bowser, Inc., has announced the opening of its new Bowser Supply Division at its enlarged sales and service quarters. The new address is 5711 Sheila St., Los Angeles.

STEEL STACK FOR PACIFIC GAS AND ELECTRIC COMPANY

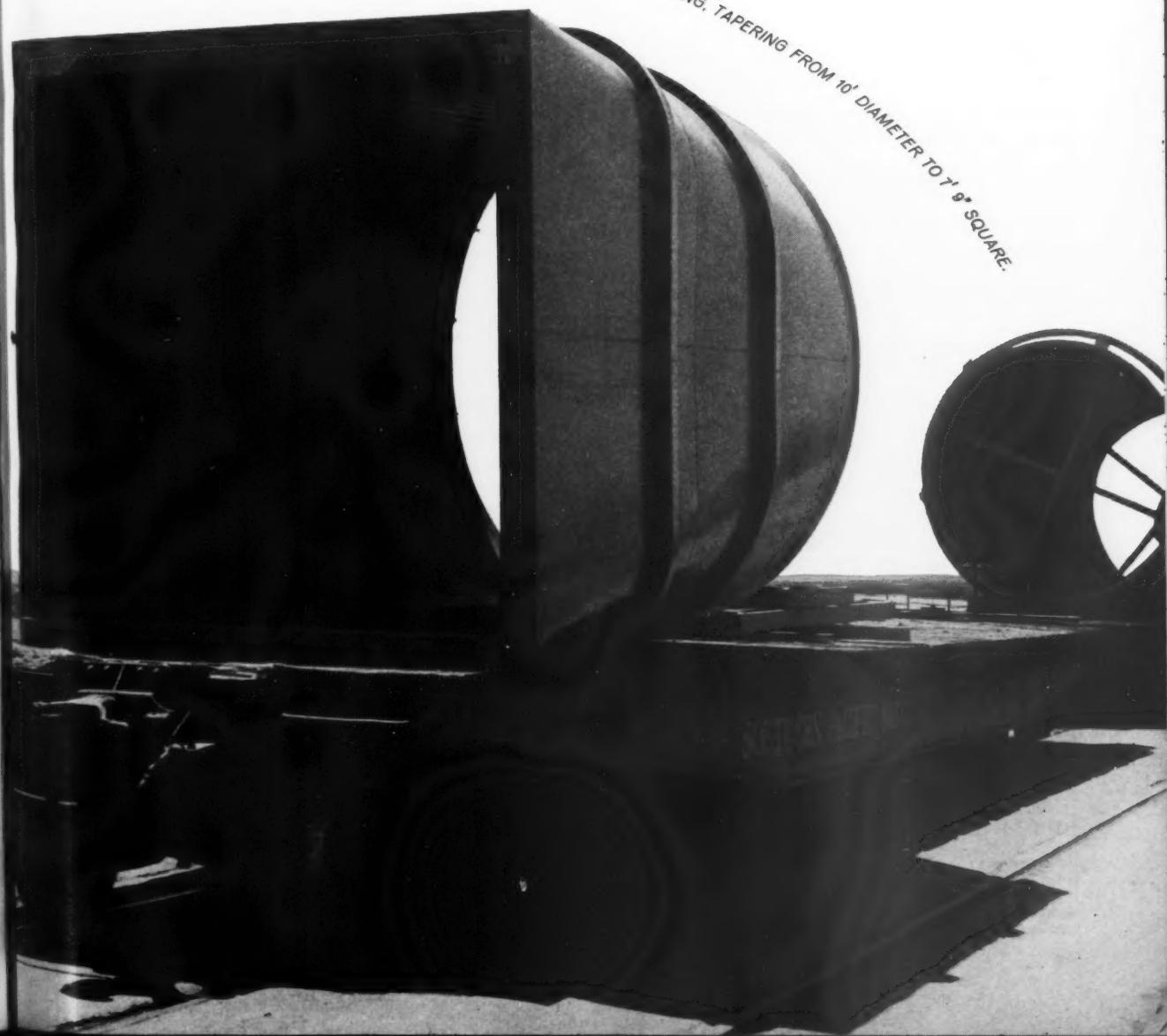
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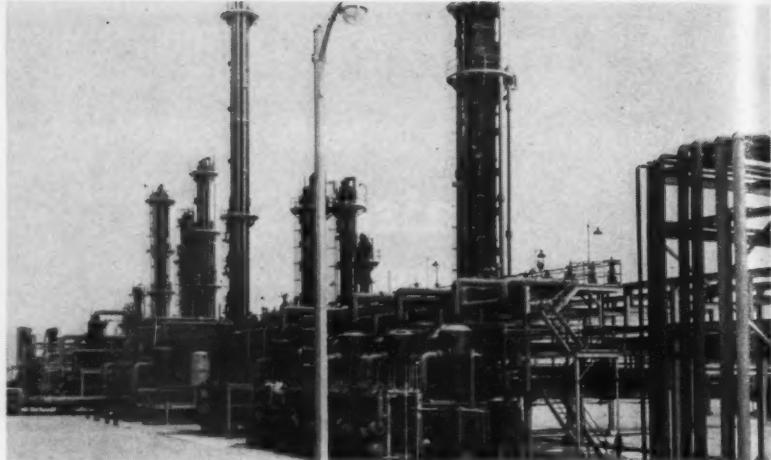
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... for more details, circle No. 72



PRODUCTION IS UNDER WAY and new additions already are being built at the Carbide & Carbon Chemicals plant in Torrance, Calif.

Carbide & Carbon opens ethylene facility in So. Calif.

Carbide & Carbon Chemicals Co., a division of Union Carbide & Carbon Corp., has opened the Pacific Coast's first petrochemical plant for producing ethylene oxide, ethylene glycol and polyethylene from the ethylene fraction of petroleum. Located on a 140-acre site near Torrance, Calif., the

plant employs 350 people.

Carbide's decision to open a Southern California plant was based on expanding West Coast markets and the ready availability of the raw material, ethylene gas. Full scale production is now going on and additions to the plant are already being built.

Boeing options site for missile plant

Boeing Airplane Co. may set up a guided missile plant at the former Ford assembly site in Richmond, Calif., on which the Seattle firm has taken an option reportedly running into six figures. The Ford plant, unused since the company's move to Milpitas early in 1955, was built in 1930 for \$3,500,000, and includes buildings and wharf facilities on the Richmond Inner Harbor.

Several sites are under consideration for the aircraft firm's new operation, which would be assembly of the Bomarc long-range guided missiles that Boeing has under development for the Air Force.

Fruehauf Trailer leases third Los Angeles plant

Fruehauf Trailer Co. has leased another plant in the Los Angeles area, bringing the number of its plants there to three. The new plant will handle all phases of materials handling problems in connection with the firm's participation in the United States' guided missile program. The decision to step up the Government's missile program was back of Fruehauf's move to lease another plant, as it will also be stepping up its research.

Conrad Creim to handle Yale lift trucks

Appointed franchise representative for sales and service of Yale industrial lift trucks is the Conrad Creim Co., of Seattle. A 2,000-sq. ft. addition to the present 2,500-sq. ft. building at 8425 First Avenue South, will be constructed to house complete service facilities, parts storage and new and used equipment. Temporary service facilities are at 300 Michigan St., Seattle.

Allis-Chalmers appoints two Western distributors

Two Western distributors have been appointed by Allis-Chalmers Industries Group. Spokane Pump & Pipe Co. of Spokane will handle motors, controls and pumps in northern Idaho and eastern Washington, while Southwest Supply Co. of San Diego will distribute V-belt drive equipment.

CF & I begins construction for San Leandro operation

Colorado Fuel & Iron Corp. has begun construction on its 80,000-sq. ft. warehouse and distribution center in the San Leandro, Calif., industrial district. The plant, which will employ 10 to 20 people when completed, will be administered by John Brittain, general manager of sales, and F. W. Hansen, district manager.

\$2,500,000 brass mill for Titan

Newark, Calif., will be the site of a \$2,500,000 brass mill scheduled for construction soon by the Titan Metal Mfg. Co. of Bellefonte, Pa. The new plant, covering about 85,000 sq. ft., will be built on a 40-acre parcel of land purchased early in 1956 from the Southern Pacific Co.

Producing brass rod and brass forgings, the mill will be the only one of its kind in the San Francisco Bay area. Construction plans are now ready and the plant is scheduled for completion in 1957.

James M. Golden, division foreman of maintenance at Titan's Bellefonte operations, where there are five plants, will represent the company during the construction period and direct operations when the West Coast mill goes into production.

Hughes will add to Tucson missile operation

Hughes Aircraft Co., manufacturer of Falcon air-to-air guided missiles in Tucson, Ariz., has reached agreement with the Tucson Airport Authority to construct a \$1,250,000 engineering facility which will eventually employ 500 people. The new unit will occupy more than 50,000 sq. ft.

Upon its expected completion in November 1957, the site will initially house about 200 electrical, electronics and mechanical engineers and physicists, plus a technical and clerical staff of 125. Within two years, the engineering staff should expand to 500, the supporting staff to about 250.

All production and engineering functions for the Falcon, now at Culver City, Calif., will be transferred to Tucson, where advanced temperature test laboratories will later be established.

Dr. Frank G. Miller will head the guided missile engineering laboratories under *Dr. Nathan I. Hall*, vice president and director of the systems development laboratories.

American Hoist forms Western subsidiary

American Hoist & Derrick Co., St. Paul, has formed a subsidiary to expand its West Coast operations. Called American Hoist Pacific Co., the firm will have headquarters in Seattle and produce heavy materials handling equipment. Emphasis will be placed on high capacity lifting devices used in testing nuclear weapons.

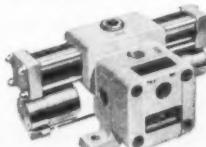
The advertisement features a large central image of a rising stem gate valve. To its left, a hand icon with the number 1 and the text "your new or existing gate valve". To its right, a hand icon with the number 2 and the text "plus a Ledeen valve actuator". Below the main valve, a hand icon with the number 3 and the text "gives you AUTOMATIC CONTROL".

SIMPLE AS 1 2 3

Without interruption of service, and with only slight modification, every rising stem gate valve in your line can be converted to automatic control by the simple and easy process of installing Ledeen Valve Actuators.

Pneumatically or hydraulically operated, these valve actuators are adaptable to gate, diaphragm and plug valves for direct or remote control.

Ledeen Valve Actuators are available in a wide range of stem pull capacities.



Control your Ledeen Actuators with Ledeen Valves

Write for Bulletin 3030

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... for more details, circle No. 73 on Reader Service Postcard

Be Wise—

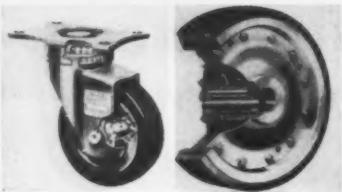
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Standardize

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Always
SWIVEL
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DARNELL CASTERS & WHEELS



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RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by zinc plating, Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

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...for more details, circle No. 74

G.E. Protective Devices leases Los Angeles building

The Protective Devices Division of General Electric Co. has leased a building in Los Angeles for \$225,000 under a long term agreement. The building was sold by Air Logistics Corp. to a Los Angeles investor at the same time it was leased to G.E.

The G.E. division will use the building for warehousing and sales of protective devices. Improvements on the 15,000-sq. ft. one-story building will be made by G.E.

Republic Supply opens Phoenix branch office

Republic Supply Co. of California has opened a branch office and warehouse in Phoenix, Ariz. The distributing firm has 8,000 sq. ft. of office and warehouse space on two acres of land with easy access to railway lines. The firm carries supplies for general industrial, chemical, mining, construction and public utilities industries.

Pacific Metals purchases San Francisco warehouse

Pacific Metals Co., Ltd., a San Francisco wholesale distributor for several metal companies, has bought a warehouse in San Francisco from Bethle-

hem Pacific Coast Steel Corp. The building will give Pacific Metals 162,819 sq. ft. of floor area.

Pacific Metals also plans to build a \$250,000 office building on the property so that it can consolidate its operations, which are now at four different locations in the city.

Tektronix announces plans for \$400,000 expansion

Tektronix, Inc., Portland, Ore., has announced plans for a \$400,000 expansion program, which calls for three new factory and warehouse buildings. A 30,000-sq. ft. factory and a similar size warehouse will be built on the firm's new Beaverton industrial site, while a 50,000-sq. ft. addition will be made to the main plant.

Computation center at Los Angeles opens

The increasing use in the West of electronic brains was punctuated by the opening of the Electronics Associates, Inc., computation center in the Los Angeles area. Located at 1500 East Imperial Highway, El Segundo, the analog computer facility is the first to be housed in a building designed specifically for such use. A guided tour of the center and its installations,

Yours for the asking...

ANSWERS TO CONVEYOR PROBLEMS

NEW, 4-page catalog tells and shows how Yuba-Schrock internal drive head pulleys save space, cut downtime, promote safety; liberally illustrated with photos of Western applications. Diagrams and charts give dimensions and speeds for sizes from 1 to 125 hp.

See for yourself how "the head pulley with the motor inside" solves conveyor problems. Write for your FREE copy of this Yuba-Schrock folder NOW.



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WESTERN INDUSTRY — December 1956

plus demonstrations of the effective and rapid use of the PACE analog computing system were given to industrial leaders who attended the center's open house.

Vitro Corp. asks approval for \$5,000,000 refinery

Vitro Corp. of America, Salt Lake City, has asked the Atomic Energy Commission for permission to build a \$5,000,000 uranium refinery in the city. The plant would go up adjacent to Vitro's uranium ore mill there.

The proposed plant would be financed privately and would be tied into a pending \$1,200,000 expansion of the firm's present mill. It would be a chemical installation.

Kaiser Aluminum plans Washington reduction plant

Kaiser Aluminum & Chemical Corp. has announced plans for an aluminum reduction plant in Washington, pending the completion of a Columbia River hydro-electric project. The plant will be built before 1961.

Kaiser will finance engineering for the Wells Site Dam and will use all the project's power not needed by the utility district's other customers. The aluminum plant's three pot lines would use 150,000 kw. of the dam's ultimate capacity of 483,000 kw. There is a possibility that construction of the dam will be slowed down by legal complications.

Worthington Corp. acquires Western manufacturing plant

Worthington Corp., New York, has acquired a West Coast manufacturing plant for year-round home air conditioning units. Located in Alhambra, the plant will be operated as the Western Air Conditioning Division of Worthington.

The plant was acquired from Royal Jet, Inc., and will be used to produce warm air furnaces and air handling equipment.

Folger & Co. to build Western coffee facilities

Southern California will have its first coffee processing facilities when J. A. Folger & Co. completes its \$900,000 plant in the Rancho San Pedro industrial section near Long Beach. Construction has begun on the 135,000-sq. ft. building.

Of steel frame and reinforced concrete construction, the building will have a small office for general sales work and plant administration, in addition to the coffee processing facilities.

\$1,100,000 mill, pea plant near completion in Spokane

The \$1,100,000 combination feed mill and pea processing plant of Inland Empire Pea Growers Assoc., Inc., is nearing completion in Spokane. It will be the largest plant of its type in the world when it is finished late this year.

The processing plant for both split and ground peas and the cattle and poultry feed mill are made up of three integrated units in a reinforced concrete structure 48 x 80 x 185 ft. Storage warehouses will adjoin it at each end.

Crucible Steel opens sales office, warehouse

Crucible Steel Co. of America held its official open house last month, playing host to over 400 Portland industrialists and businessmen at its new sales office and warehouse building.

Guests saw a warehouse that contains the latest facilities for storing and materials handling, as well as a complete stock of the firm's stainless, alloy, tool, and high speed steels. The warehouse and office, to be managed by Earl W. Hassel, will serve Crucible customers in the Portland and surrounding areas.

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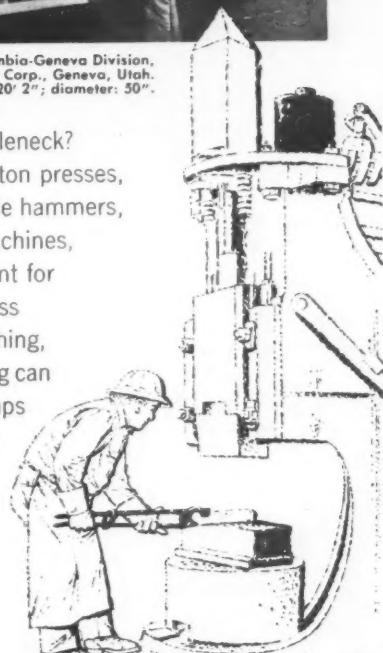
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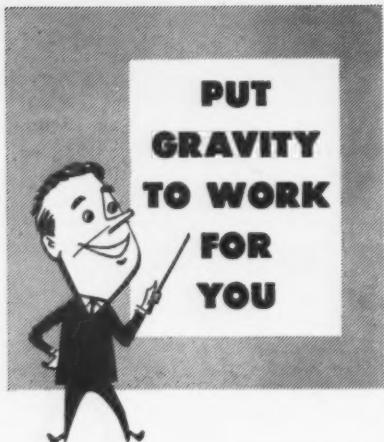
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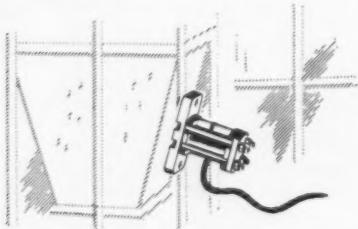
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MANUFACTURED ON THE BUILDING SITE, concrete roof panels used by GE at its million dollar Los Angeles facility saved both time and money.

GE uses on-the-job panel manufacture in L.A.

Pre-tensioned, pre-stressed concrete roof panels manufactured on the building site are saving time and money for General Electric in the construction of its million dollar warehouse and office facilities in Los Angeles. This marks the first time that panel manufacturing has been done on the building site by the contractor.

On-the-job panel manufacturing requires designing, building and operating pre-tensioning casting beds, an expensive project, but in this case a money saver as concrete panels were specified for 100,000 sq. ft., or more than 83% of the total area.

Contractor Noyes Roach Co. in joint venture with C. L. Peck, installed four panel beds and one girder bed, each resting on a 4-in. concrete slab, to manufacture the 496 roof panels and 84 girders called for in the plans. Twenty-eight roof panels and seven girders were produced every three days on the job site and stockpiled. By the time the foundation and floor were finished and the supporting columns in place, the concrete panels were ready for erection, saving a great deal of time.

Begun last July, the building is expected to be completed next month.

Crown Zellerbach to build \$8,000,000 Antioch plant

Crown Zellerbach Corp., San Francisco, has announced plans to build an \$8,000,000 plant in Antioch to help meet demands on the firm for its paper products. Construction will start early in 1957 on the specialty paper products plant, which will make household tissue, napkins and bags.

New plant should be completed by next summer. The firm already operates in Antioch a kraft paper plant, multiwall bag plant and has under construction a corrugated box plant.

Union Oil plans L.A. ethylene plant

Union Oil Co. of California plans a multi-million dollar production plant for ethylene at its Los Angeles refinery. A yearly output of some 100,000,000 lb. of ethylene is anticipated, and refinery gas will be the basic raw material, Union officials said. The plant is scheduled for completion in 1958.

Much of the ethylene manufactured will be delivered by pipeline to a \$10,-

000,000 polyethylene plastics plant in Los Angeles County, which is being constructed by Koppers Co., Inc., and Brea Chemicals, Inc. The latter is a wholly-owned subsidiary of Union Oil.

Commonwealth Steel moves to larger warehouse

Commonwealth Steel & Supply Co., distributors of sheet steel and wire products, has moved to a new and larger warehouse in Los Angeles, doubling the amount of its floor space. More space was needed when the operations of Commonwealth were merged with those of Howard Supply Co., which purchased Commonwealth last year.

The new warehouse will make enough space available to add a line of specialty sheets and strip, as well as aluminum roofing and siding.

Kaiser Gypsum buys Fir-Tex Oregon plant

In a multi-million dollar transaction recently completed, Kaiser Gypsum Co., Inc., purchased the physical assets

of Fir-Tex Insulating Board, Inc.

The Fir-Tex facilities, one of four plants producing insulating board in the West, include the principal plant at St. Helen's, Ore.; more than 16,000 acres of timber land in Oregon and Washington, and Western Insulated Products, Inc., a wholly-owned subsidiary. There are 14 major buildings located on 175 acres of the Fir-Tex property.

Borden to build "penta" plant in L.A.

Plans to build a pentaerythritol plant at Dominguez, Los Angeles County, have been announced by the Borden Co.'s chemical division. Expected annual production capacity will be 10,000,000 lb. of "penta," a compound used extensively in manufacturing paint resin and primarily produced in the East.

Additional facilities at the plant will permit yearly production of up to 40,000,000 lb. of formaldehyde, which will increase Borden's present output capacity of that chemical by more than 20%.

GE expands Stanford microwave laboratory

Size will be better than doubled and staff will be increased by 40% at General Electric Co.'s microwave laboratory at Stanford Industrial Park near Palo Alto, Calif. Scheduled for completion late this summer, the expansion plans call for an increase of the present 21,000-sq. ft. space to a total of about 43,000 sq. ft. Present staff is 132 persons.

Plant for jet parts slated in Seattle

A jet parts plant, costing between \$4,500,000 and \$5,000,000, is slated to be built in Seattle for Boeing Airplane Co. by the Parr Industrial Corp. of San Francisco. Construction of the 500,000-sq. ft. building has begun and when completed will bring to more than 1,100,000 sq. ft. the space the aircraft firm is leasing from Parr.

New California plant for Adhesive Engineering

Manufacturers of metal strapping adhesive which eliminates need for rivets, Adhesive Engineering has under construction an 8,000-sq. ft. plant in San Carlos, Calif. Presently located in Berkeley, Calif., the company plans to occupy its new plant about Sept. 1. New plant calls for 6,000 sq. ft. of production area, with the remaining space devoted to offices.

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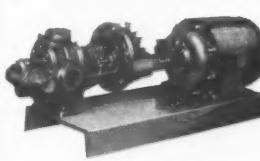
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THIS NEW \$1,500,000 PASADENA CENTER houses engineering, research and marketing divisions of Consolidated Electrodynamics Corp.

Consolidated Electrodynamics opens center, plans two more

Consolidated Electrodynamics Corp., Pasadena, Calif., electronics firm, has opened an engineering, research and marketing center and announced plans for two more buildings to be constructed during 1957.

The new three-story center, with 130,000 sq. ft. of floor space, cost Consolidated about \$1,500,000 and incorporates large mosaic panels for decoration.

The firm's new construction includes two 130,000-sq. ft. buildings to be located on 10 acres of the former Monrovia, Calif., airport property. The first building will be a two-story

office and plant structure, the second for production work.

Two Daystrom subsidiaries expanding in the West

Two Daystrom, Inc., subsidiaries are expanding their Western operations. Weston Electrical Instrument Corp. has just opened a new branch office in Los Angeles, while Daystrom Pacific Corp. has announced plans to build a new plant.

An open house reception for Southern California industrial leaders marked the opening of Weston's branch, which has been designed to help the firm increase its efficiency in servicing industry in the area and pro-



The tiny ant has strength and stamina far out of proportion to its size . . .

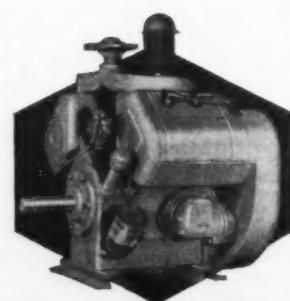
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WESTERN INDUSTRY — December 1956

vide for further expansion. Staffed by sales engineers and instrument specialists under branch manager *Kenneth C. Moulton*, the headquarters will serve as a focal point for instrument sales, warehousing and application engineering.

Construction has already begun on the 50,000-sq. ft. plant structure for Daystrom Pacific. New facilities will be located in the Westchester section of Los Angeles near the International Airport.

Line Material to build power equipment plant

Line Material Co. of Milwaukee, a division of McGraw Electric Co., has announced plans to build a plant to serve the West Coast electric power industry. The supplier of electric power equipment has selected Visalia, Calif., as the site.

The plant will employ about 150 people when it is completed in May 1957. Initial production will be distribution transformers.

Atlas Equipment named Tuthill Pump distributor

Tuthill Pump Co., Chicago, has named Atlas Equipment Co., Seattle, Wash., as sales representative in the Northwest. Atlas' territory will include Washington, Oregon, Montana, Idaho and Alaska.

Tuthill manufactures internal gear rotary pumps for hydraulic, lubrication, coolant and liquid transfer services, and specializes in custom-engineered pumps.

Howard Supply has new L.A. location

New headquarters for the Howard Supply Co.'s sheet steel and wire products division is 1916-18 East 51st St., Los Angeles. This location will also house Howard's subsidiary, Commonwealth Steel & Supply Co. The firm's main warehouse, accommodating the rest of the steel department, as well as industrial supplies and pipe, is at 5125 Santa Fe Avenue in L. A.

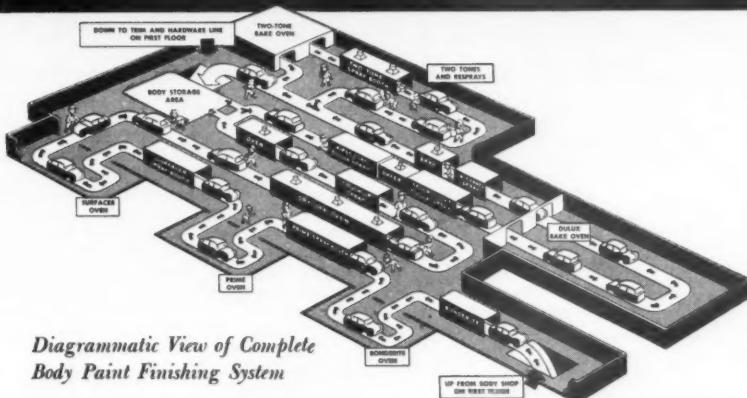
Savolt Corp. adds plant facility engineer service

Savolt Corp., of Newport Beach, Calif., has added a plant facility engineer service to its plan, because of the present shortage of plant facilities engineers. The firm hopes to make its Savolt Plan, directed at effecting utilities cost control through engineering, a one-stop service for small or medium sized businesses.



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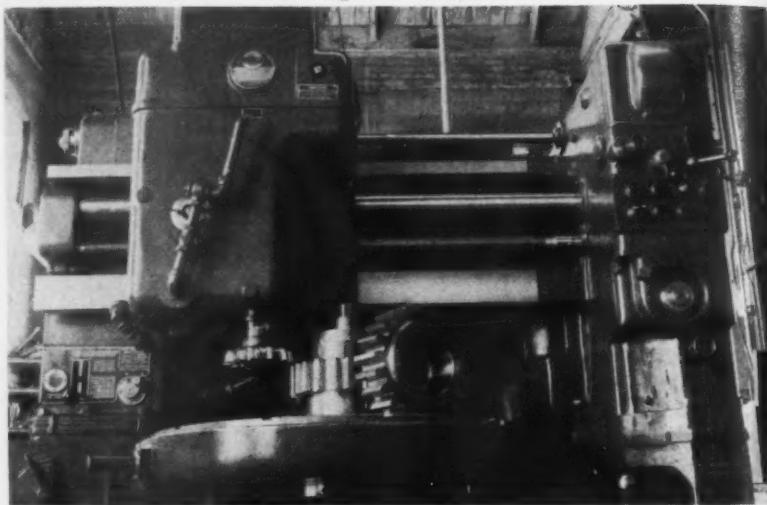
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Associated installs new gear shaper



CAPABLE OF HANDLING 36-IN. PITCH GEAR SHAPING, this Fellows gear shaper was installed recently at Associated Gear & Machine Co. in Los Angeles. Other specs featured on the unit are a face width of 6 in., a helical angle of 45 deg., and a D.P. rating of 3 and 2 for spur and 4/5 for helical.

WESTERNERS AT WORK . . .

Kaiser Steel Corp.

... along with Kaiser Aluminum and Kaiser Engineers Division, has announced personnel changes recently. At the steel company's operation in Oakland, *Mark T. Anthony* was named assistant to the vice president and general manager, succeeding *Frank Scarf* who is now assistant general manager of Kaiser Center, Inc. *James A. Wiggs*, a salesman in the Southern California district for six years, has been transferred to Phoenix, Ariz., to head the sales office for that state.



N. R. Dewar



M. T. Anthony

At the engineers division of Kaiser in Oakland, *David H. Wheeler* will serve as air pollution control engineer, working with general industry as well as in new plant construction. Announced at the food container plant, Foil Kraft division of Kaiser Aluminum, in Los Angeles, was the appointment of *Neil R. Dewar* as manager. Formerly he was a public accountant, and on the staff of Foil Kraft, Inc., before Kaiser purchased that plant.

W. P. Fuller & Co.

... has begun a new administrative set-up with establishment of four major districts in the 11 Western states, and managers for each scheduled to assume duties this month. The men appointed are *H. B. Wilson*, South-

ern district; *S. H. Kline*, Central district; *Paul Loynd*, Intermountain district, and *C. E. Freeman*, Northwest district. Additional promotions in effect now at the paint company include the following: *P. A. Sherrard*, Los Angeles branch manager; *Paul C. Keenan*, San Diego manager; *M. H. Poppett*, manager of the San Francisco branch; *W. Schweitzer*, manager of the newly-created Seattle branch; *L. R. Brown*, Sacramento branch manager, and *L. R. Templeton*, Boise, Idaho, branch manager.

Rockwell Manufacturing Co.

... has promoted two plant managers in the meter and valve division. *Earl Hudson*, who was named general manager of the Porterville, Calif., plant in January 1956, has been transferred to the DuBois gas meter plant as general manager. *A. A. Familyant*, former general manager of the Tulsa, Okla., plant will assume the general management of the Porterville plant when it is completed next year.

Allis-Chalmers Manufacturing Co.

... has appointed *Donald E. Alworth* a service engineer for the Rocky Mountain region of the Allis-Chalmers Industries Group with headquarters in Denver. Alworth recently completed the firm's training course for graduate engineers.

Mater Machine Works

... of Corvallis, Ore., has named *Adrian R. Landers* plant manager, replacing *Charles T. Paine*, who has become chief mechanical engineer for the Edward Hines Lumber Co. Landers was formerly with Keystone Machine Works and Kinwood Machine Works.

C. A. Norgren Co.

... has promoted *Frank T. Goll* to sales manager of the firm, after he had served as assistant in that post since 1954. Before joining the Norgren organization, Goll was with the credit and accounting departments of Parke Davis Co. in Denver. He has also been associated with the chemical and insurance fields.

Hughes Aircraft Co.

... has named *H. L. Gillespie* superintendent of facilities programming and *H. L. Wiles, Jr.*, as head of facilities layouts and statistics. Recently promoted to general foreman of production in the semiconductor division was *C. H. "Bud" Seylor*.

Yale & Towne Manufacturing Co.



C. R. Dean, Jr.

... has promoted *Clyde R. Dean, Jr.*, to general sales manager. Formerly director of export sales for Yale's materials handling division, Dean has spent nearly 20 years in sales, service activities and sales promotion of industrial lift trucks and hoists. A graduate of Oregon State College, he has been with the Yale firm since 1954.

Kennedy Valve Mfg. Co.

... has appointed *Jack W. Skinner* West Coast branch manager, with offices in San Francisco. A native of that city, Skinner has run his own valve and fitting business and was formerly with the Grinnell Co. Along with Skinner's appointment, the firm announces expanded sales and service programs in the West providing a wider range of merchandise and improved delivery service.

North American Aviation, Inc.

... has new titles for three men in its organization. Two with the Autometrics division are *Joseph A. Geisler*, named assistant factory manager, and *C. R. Raftery*, who has been appointed director of material after serving in a similar capacity at North American's Downey plant. Also named a director of material, but at the missile development division, was *Mark A. Starr*, who previously served as purchasing agent.

Bethlehem Pacific Coast Steel Corp.

... has appointed *Ray Pontious* to superintend the steel company's Seattle bolt-making plant. Formerly assistant superintendent of the Los Angeles bolt and nut plant, he replaces *Harold Blackmire*, who will now head the Southern California operation. Retirement for *Leslie G. Knight*, a



Ray Pontious

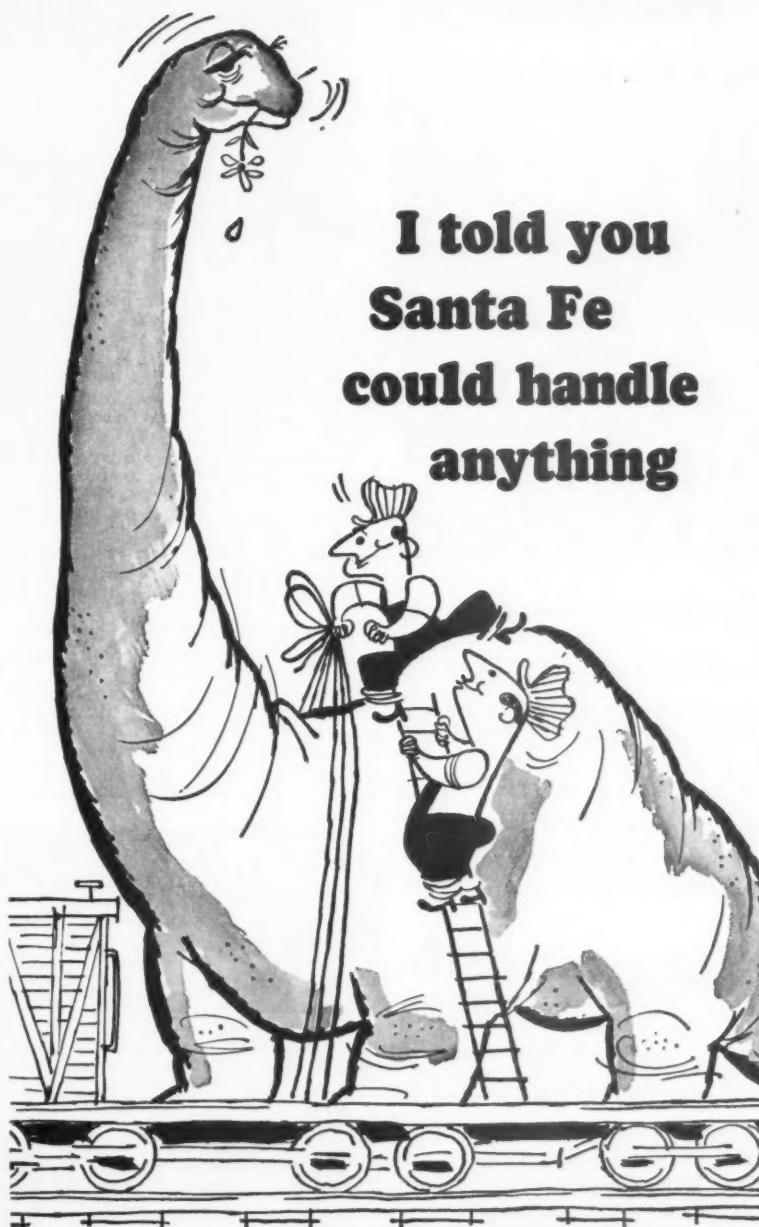


L. G. Knight

veteran of 46 years with Seattle's steel industry, was also announced. Much of Knight's service was as the company's chief executive in the Northwest, and after 1953 he served as assistant to the president.

Furane Plastics, Inc.

... has announced the appointment of *J. C. de Graaf* as sales manager of its coating division. Previously sales manager for Simmonds Aerocessories, Inc., and a real estate manager in New York, de Graaf came to the Furane firm after eight years with the Fruit-O-matic Mfg. Co.



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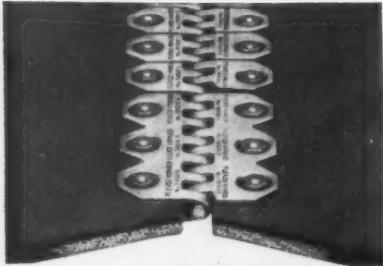
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100

Sandvik Steel, Inc.



O. H. Hellsund

... has announced the appointment of *Olof H. Hellsund* as Western district engineer for its steel belt conveyors division. During his ten years with that division, Hellsund has been both field and design engineer.

Warren & Bailey Co.



G. W. Jeans

... has named *Glenn W. Jeans* as manager of the Emeryville, Calif., office. A long-time resident of the San Francisco Bay Area, Jeans has been associated with the supply business for the last 10 years, after working for the Shell Oil engineering division.

New Plastic Corp.

... has elected *John Schmidt* of Burbank as vice president in charge of sales. Schmidt has been with the corporation for 15 years, during which he has served as plant superintendent, division engineer, chief engineer and sales manager of the tool division.

Kennecott Copper Corp.

... has selected *Thomas J. Hubbard* to head the Magna plant of the corporation's Utah Copper Division. The new superintendent succeeds *John Allan*, retired after 43 years. A native of New Mexico, Hubbard joined Kennecott in 1937, holding the position of maintenance and construction engineer at Hurley, N. Mex., until his 1955 transfer to Magna, Utah, as general master mechanic.

Sylvania Electric Products, Inc.

... has formed a new sales organization for fluorescent lighting fixtures, with *Roger J. Delander* as Western area sales manager. Delander, who will work out of San Francisco, has been with Sylvania since 1939, handling sales positions in the Midwest and Pacific Coast areas, most recently in Seattle.

Crucible Steel Co.

... has made several personnel changes at its Los Angeles branch. *Harry Christensen*, formerly the A. M. Castle firm manager in Los Angeles, is now Crucible's warehouse manager. *T. A. Wilmsurst* has been promoted to the post of stainless steel sales supervisor, after 11 years with the company. New supervisor of alloy steel sales is *J. F. Musgrave*, a Crucible employee since 1945. Promoted to be assistant office manager is *Irving Gay*, a Western Steel firm employee until last February.

Westinghouse Electric Corp.

... has transferred *Robert R. Price* from Sunnyvale to San Francisco, where he will be regional gearing division representative. He held a similar position at the Sunnyvale plant, where he joined the firm in 1953.

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WESTERN INDUSTRY — December 1956

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Marchant Calculators, Inc.

... has created a new post, that of general superintendent-manufacturing, and named John E. Wilson to fill it. Starting with the firm as an apprentice tool and die maker, Wilson has advanced through supervisory levels and steps up now from the position of parts production plant superintendent. Rollo J. Lawrence will take over that post, transferring from the corresponding job at Marchant's assembly plant. Gabriel Rodrigues, formerly general foreman for assembly, has been promoted to superintendent.

The Rucker Co.

... has enlarged its Seattle operation and named Leonard E. Peters as field engineer with that staff. With a background in production control, engineering, estimating and other phases of hydraulic control systems, Peters has served with Boeing Airplane Co., and the Johnson Service Co.

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U. S. Steel Corp.

... has announced appointment of three executives to new posts in the West. Marshall B. Harrison has been advanced to assistant vice president in charge of sales solicitation for the Columbia-Geneva division, and Burton C. Smith to assistant vice president of distribution for that unit. Alex Walker, Jr., of San Francisco, becomes Intermountain district vice president for sales, with headquarters at Salt Lake City, Utah.

Flexible Steel Lacing Co.

... has named Jim McComb to cover California sales of its Flexco and Alligator belt fasteners for joining conveyor and transmission belts. A factory and field trained representative equipped to expedite distribution policies of the company, he joined the organization after six years of engineering and sales experience in the machine tool field.

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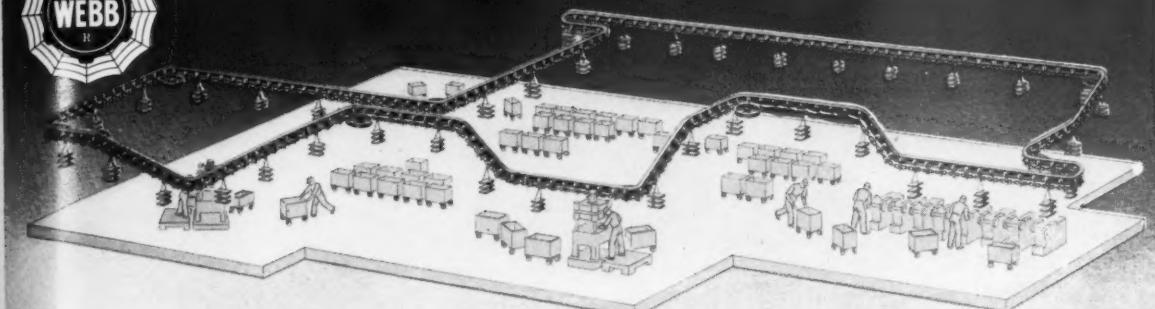
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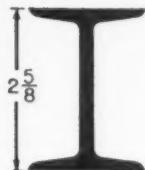


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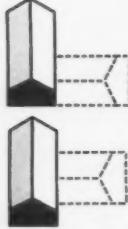
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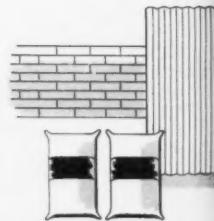
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